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List of trees and shrubs mentioned in the Report and their scientific names.

English and Vernacular names.	Scientific name.
Ain, matti	*Terminalia tomentosa.*
Anjan	*Hardwickia binata.*
Asana	*Bridelia retusa.*
Babul	*Acacia arabica.*
Bahan	*Populus euphratica.*
Bamboo	*Dendrocalamus strictus.*
Ber	*Zizyphus jujuba.*
Blackwood	*Dalbergia latifolia.*
Chiva (bamboo)	*Oxytenanthera monostigma.*
Dhaman	*Grewia tiliaefolia.*
Dindal	*Anogeissus latifolia.*
Eucalyptus	*Eucalyptus globulus.*
Hirda	*Terminalia chebula.*
Hodjali	*Acacia latronum.*
Honne	*Pterocarpus marsupium.*
Jamba	*Xylia xylocarpa.*
Jambul	*Eugenia jambolana.*
Kalamb	*Stephegyne parvifolia.*
Kandi	*Prosopis spicigera.*
Karambel	*Dillenia pentagyna.*
Khair	*Acacia catechu.*
Lantana	*Lantana camara.*
Nim	*Melia indica.*
Palas	*Butea frondosa.*
Rosha	*Andropogon Martinii.*
Sandal	*Santalum album.*
Shigekai	*Acacia concinna.*
Shemat	*Odina wodier.*
Shivan	*Gmelina arborea.*
Simul, Sawar	*Bombax malabaricum.*
Tali	*Dalbergia sissoo.*
Teak	*Tectona grandis.*
Tugli	*Albizzia amara.*
Tiwas	*Ougeinia dalbergioides.*
Wadiya	*Acacia senegal.*

FOREST ADMINISTRATION REPORT OF THE BOMBAY PRESIDENCY INCLUDING SIND FOR THE YEAR 1928-29.

CHAPTER I.

1. Alteration in Area. (Forms 51 to 51-D.)

The changes in forest area were as follows :—

Class of Forest	Area on 1st April 1928	Added during the year	Excluded during the year	Area on 31st March 1929
	Square miles.	Square miles.	Square miles.	Square miles.
Reserved ..	13,710	52	52	13,710
Protected ..	1,221	15	41	1,195
Total ..	14,931	67	93	14,905

The areas added and excluded comprise :—

	Square miles. Gain.	Loss.
Afforestments against and disforestments in favour of cultivation	·8	20
Alluvial accretions and erosions in Sind	15	22
Transfer from Reserved Forest to Protected Forest in Southern and Sind Circles	12	12
Transfer from Protected Forest to Reserved Forest in Southern and Sind Circles	35	35
Transfer from one Division to another in Central Circle.	4	4
Errors corrected in Southern Circle	·2	..
	67	93
Net loss ..	26 Sq. miles.	

There was a net decrease of 26 square miles in the total area of the Presidency owing chiefly (1) to disforestment of large areas in the East Nasik Division of the Northern Circle for purposes of cultivation and (2) to heavy erosions in the Sind Circle.

The forest area in charge of the Forest and Revenue Departments stood as follows :—

	On 1st April 1928			On 31st March 1929		
	Reserved	Protected	Total	Reserved	Protected	Total
	Sq. M.	Sq. M.	Sq. M.	Sq. M.	Sq. M.	Sq. M.
In charge of the Forest Department.	11,732	590	12,322	11,755	564	12,319
In charge of the Revenue Department.	1,978	631	2,609	1,955	631	2,586
Total ..	13,710	1,221	14,931	13,710	1,195	14,905

The forest area in various circles at the end of the year was :—

	Square miles.
Northern Circle	3,804
Central Circle	5,330
Southern Circle	4,623
Sind Circle	1,148

2. Forest Settlements. (Form 52.)

Out of 156½ square miles of forest area remaining to be settled at the close of the previous year 1½ square miles were eroded in the Sind Circle before settlement. The settlement of the remaining area, *viz.*, 155 square miles, chiefly in the Northern and Sind Circles, was in progress at the commencement of the year. To this an area of 31 square miles, chiefly in Sind, was added during the year. The area finally settled during the year amounted to 48 square miles, chiefly in Sind, and 138 square miles remained to be settled at the close of the year. No expenditure was incurred on settlement during the year.

The question of finally notifying as reserved forest certain rabi numbers in Peint Taluka, the inclusion in forest of which was sanctioned in Government Resolution, Revenue Department, No. 3842 of 1st June 1927, is still pending with the Revenue Department.

The settlement of 1,713 acres in the Kolaba Division still awaits the outcome of the Civil Court proceedings taken by Sardar Biwalkar.

3. Demarcation.

One hundred miles of new boundary line were demarcated during the year in all the four Circles of the Presidency at a cost of Rs. 680. Forty-six miles remained to be demarcated in the Southern Circle. The existing boundary lines and marks were kept in a state of repair at a cost of Rs. 3,706, a great part of this work being done by forest subordinates.

According to the prescriptions of the Revised Working Plan for the Dangs (Surat Division) the boundary line between the Dangs and the Baroda State has to be cleared 50 feet wide on the Dangs side wherever this has not been done already. A part of this work was done during the year and the remaining work will proceed next year.

The remaining 2½ miles of the 30 feet line between the British and Portuguese territory in the Belgaum Division were cleared during the year under review at a cost of Rs. 75.

4. Forest Surveys. (Form No. 54.)

No surveys were carried out during the year. The area remaining to be surveyed is 13 square miles in the Northern Circle, 276 square miles in the Southern Circle and 919 square miles in the Sind Circle.

The expenditure on the constitution of State forests was as follows :—

Circle.	1928-29.	1927-28.
	Rs.	Rs.
Northern	733	9,568
Central	..	1,215
Southern	79	587
Sind	..	..

CHAPTER II.

MANAGEMENT OF STATE FORESTS.

1. Regulation of Management.

(*a*) *Preparation and Control of Regular Working Plans.*

Preparation (*Form No. 55*).—The work of preparation and revision of Working Plans was carried out by the various Working Plan Officers controlled by their Conservators and the Chief Conservator. The work done during the year is summarised below.

The following Working Plans received the sanction of Government :—

(*i*) A revised Working Plan for the Bulsar-Chikhli forests in Surat Division.

(*ii*) A revised Working Plan for the Nersol Slopes forests, Block XVII in Kanara Eastern Division.

(*iii*) A revised Working Plan for the Teak Pole, Fuel and Sandalwood forests of Khanapur and Nagargali Ranges (including also sandalwood area of Gujnal Range) of Belgaum Division.

The following Working Plans received the approval of the Chief Conservator and were submitted to Government for sanction :—

(*i*) A Working Plan for the Below-Ghat forests (Peint and part of Mokhada) of West Nasik Division (sanctioned by Government after the close of the year).

(*ii*) A revised Working Plan for the Bhagvati high forests, Blocks VIII, IX and XX in N. D. Kanara (sanctioned by Government after the close of the year).

(*iii*) A revised Working Plan for the Ankola, Kumta and Honavar-Bhatkal inland forests of the coastal tract in S. D. Kanara (sanction received from Government at the time of writing this report).

The work in connection with the following Working Plans, of which preliminary reports have been approved by the Chief Conservator, was continued during the year :—

(*i*) Scrub jungle and Jamner Teak Pole area in East Khandesh Division (Revision).

(*ii*) Umarpata teak in West Khandesh Division (Revision).

(*iii*) Taloda Teak Timber and inexploitable areas in North Khandesh Division (Revision).

(*iv*) Tali Palm area in S. D. Kanara (Revision).

(*v*) A Working Plan for the scrub forests of Sakri, Pimpalner and Dhulia Ranges in West Khandesh Division (Original).

Preliminary Working Plan Reports for the (*i*) Nasik Scrub and Teak Pole jungles and (*ii*) Sandal areas in Dharwar-Bijapur, Kanara Northern and Eastern Divisions, were submitted to and approved by the Chief Conservator during the year.

The investigation of the question of altering the rotation of certain felling series of the Revised Thana Working Plan was continued during the year by the Working Plans Officer, Northern Circle.

There was a net addition of 14 square miles to the area under Working Plans during the year, which now amounts to 8,349 square miles out of a total of 9,322 square miles for which Working Plans are considered to be necessary. New plans are now under preparation for 373 square miles out of 973 square miles for which plans are still required. In addition to this old plans are under revision for an area of 580 square miles. On the whole good progress was made with the preparation and revision of Working Plans.

(*Form No. 55A*).—The prescriptions of sanctioned Working Plans were carried out as far as possible in all Circles. In the Northern Circle some coupes remained unsold for want of demand due to poor quality of growth, long lead or inaccessibility of the area. There was a poor demand for coupes in East and West Khandesh Divisions. In East Khandesh this was partly due to the alterations made in the rules dealing with standard reservation and execution of fellings, resulting in less yield of teak and valuable injaili and partly to the unfavourable competition with the material from the Holkari State forest coupes which have been opened up by the roads constructed in the Satpudas and which are sold at comparatively low prices and under easy conditions of working. In West Khandesh Division it was due to poor quality of growth. Scarcity of labour was responsible for arrears in working in some cases in the Southern Circle. In the Khanapur Range of the Belgaum Division no fuel coupes, with the exception of one sold to the Criminal Tribes Settlement, were auctioned owing to slump in the fuel market and to large stocks of fuel already held by contractors at various depôts.

2. Communications and Buildings.

(*a*) *Roads and Bridges.*

Construction was in progress on 241 miles of new roads and repairs were carried out on 1,238 miles of old roads. The total expenditure under this head was Rs. 2,45,296 (Rs. 1,39,216 for new works and Rs. 1,06,080 for repairs) as against Rs. 2,52,840 (Rs. 1,37,891 for new works and Rs. 1,14,949 for repairs) during 1927-28. Most of the expenditure both on new works and repairs was incurred in the Northern and Southern Circles where the need for better communications is most felt. The amount charged to repairs includes maintenance charges on the Alnavar-Dandeli Railway, *viz.*, Rs. 39,097 against Rs. 46,998 of the

previous year, and contribution of Rs. 25,000 to the District Local Board, Kanara. As regards this latter item, the Conservator of Forests, Southern Circle, questions the justifiability of such a large contribution as many of the roads useful to the Forest Department are entirely neglected.

There has not been much progress in the construction of the Baroda section of the Subir-Navapur road, the work having been stopped for some time. The State authorities on being moved to expedite progress have now resumed the work.

In order to obtain a profitable market for timber from Peint (West Nasik) and Sugadamba (North Thana) forests, it is proposed to align a road from Ozhar in Peint to Saiwan in North Thana, entirely through British territory if possible, so as to avoid levy of toll or duty on our produce, and other complications anticipated, were the road to pass through foreign territory. The road is being surveyed by the Forest Engineering Branch and if the proposed road is found feasible the suggested Goldhari-Udhwa road which involves passing through foreign territory for a considerable distance will be dropped as it will no longer be necessary.

The Conservator of Forests, Southern Circle, reports that owing to insufficient budget provision it was not possible to keep roads in his Circle in an efficient state of repair, and these are consequently deteriorating under the heavy timber traffic to which they are subjected. If the roads are not kept in good repair, it will be necessary to incur heavy expenditure on special repairs in subsequent years.

(*b*) *Buildings.*

The total expenditure on buildings was Rs. 1,12,924 (Rs. 73,788 on new works and Rs. 29,136 on repairs) as against Rs. 1,03,228 (Rs. 66,682 on new works and Rs. 36,546 on repairs) during 1927-28. The expenditure on new works was for the most part incurred on quarters for subordinates. The construction of the Rest House at Sundha in the Northern Circle, started during 1927-28, was completed during the year. Special repairs to Rest Houses at Jamboti, Nagargali and Kadra in the Southern Circle were carried out. There have been complaints from Conservators that the funds granted for repairs are inadequate and that more quarters for subordinates are badly required.

(*c*) *Miscellaneous.*

Rs. 7,381 were spent on new works and Rs. 9,063 on repairs, as against Rs. 11,383 and Rs. 10,408 respectively in the previous year. The expenditure under this head was incurred on wells, fencing of compounds, telephone rent, charges for water supply paid to the Public Works Department, construction of and repairs to karias (water courses) and sluices in Sind and the improvement of water supply in the Satpuda forests.

3. Protection of Forests. (Form No. 57.)

(a) *General protection.*

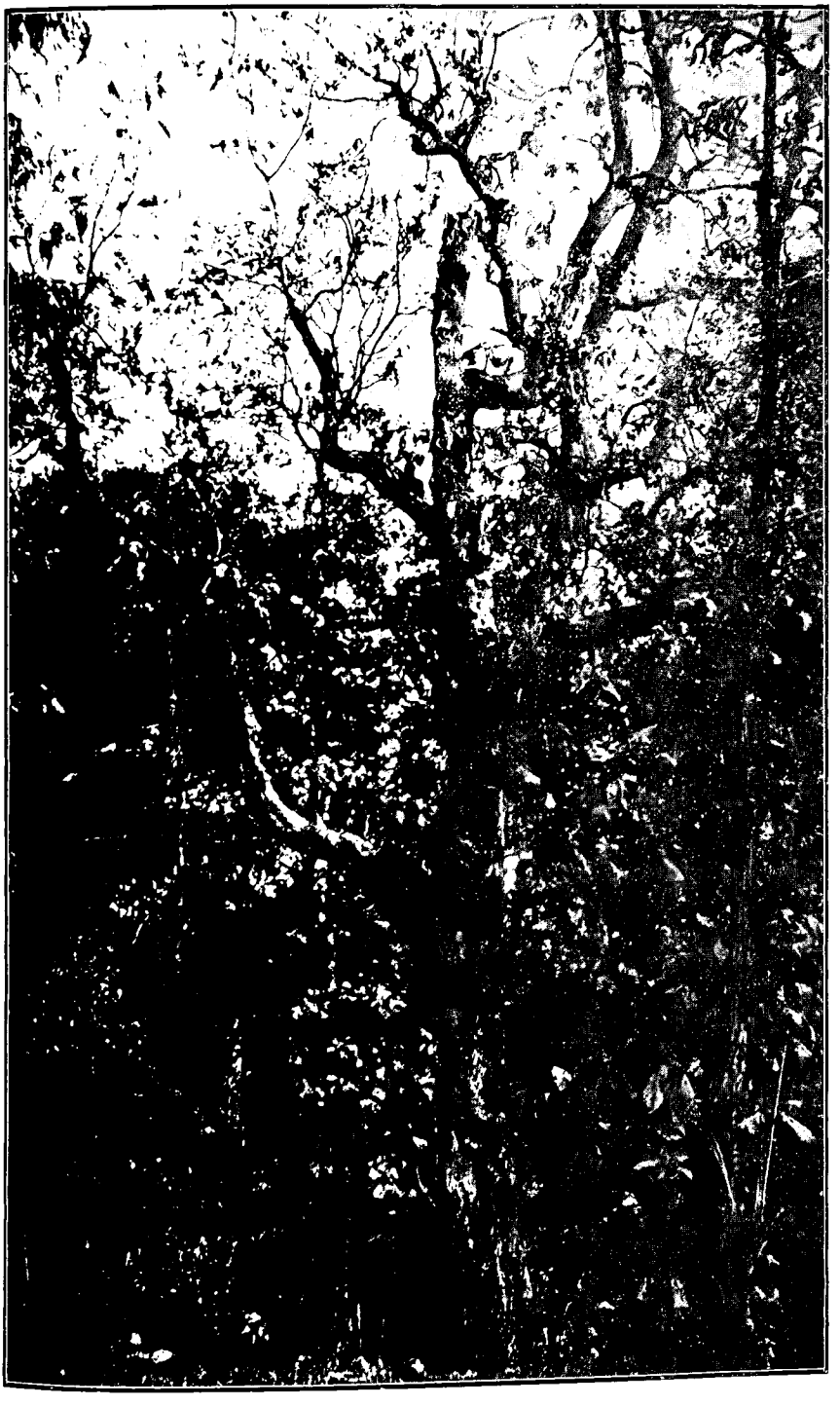
The following statement compares the number of forest offences of the year with those of 1927-28 and the average of the last three years :—

Class of offence	1928-29					1927-28	Average of 1925-26 to 1927-28
	Northern Circle	Central Circle	Southern Circle	Sind Circle	Total		
I—Injury to forest by fire.	711	659	554	264	2,188	1,744	1,882
II—Unauthorised felling or removal of produce.	3,653	3,661	1,368	1,531	10,213	9,432	9,150
III—Unauthorised grazing.	2,094	2,145	791	1,470	6,500	6,788	6,798
IV—Other offences.	527	1,283	290	123	2,223	2,040	1,883
Total of 1928-29 ..	6,985	7,748	3,003	3,388	21,124	..	..
Total of 1927-28 ..	6,207	7,773	2,886	3,138	..	20,004	..
Average of 1925-26 to 1927-28.	5,902	7,517	3,037	3,197	..	..	19,713

As compared with the previous year there was an increase of 1,120 in the total number of offences, all Circles except the Central Circle contributing thereto, and an increase of 444,781 and 183 under I, II and IV and a decrease of 288 under III.

The causes for the increase in fire offences are discussed under "Protection from fire".

Unauthorized fellings were heavy in Thana, West Khandesh and Poona Divisions. In East Thana Division the villagers are reported to be in the habit of girdling trees and manufacturing deadwood which they are privileged to remove. It has therefore been necessary to entertain extra temporary guards there to prevent this depredation. Illicit cuttings on an extensive scale by Koli villagers in Poona Division were detected with the result that teak timber of the value of Rs. 5,195 was recovered and attached. The offenders in this case were not prosecuted as they expressed their willingness to compound and a sum of Rs. 2,404 was recovered from them as compensation. The number of offences under illicit fellings increased when compared to 1927-28 by 781, *i.e.*, 8 per cent. This considerable increase is attributed to the suspension of communal punishment. Communal punishment is not much resorted to in the case of illicit cuttings, being unsuitable as a remedy for comparatively isolated offences. But where hacking and wanton damage is done over large areas or when organized loot is carried out on a large scale as in the cases mentioned above, the Department will find it impossible to protect its forests unless the power to award this form of penalty is restored.



MALTREATED *TEAK* LOPPED FOR RAB.
Notice the steps cut in bole to facilitate lopping.
(Waghai, Dangs, Surat Division, Northern Circle.)

[*To face page 6*

The decrease in grazing offences is partly due to a large number of owners of cows and buffaloes keeping away from the forests owing to dearth of ground pasture in Sind.

The increase under " other offences " is mainly due to encroachments from inforest cultivations in West Nasik Division in the Northern Circle and to enforcement of transit rules for the removal of Hirda from occupied lands in the Southern Circle. The encroachments from inforest cultivations in West Nasik Division will be greatly reduced in future as a regular demarcation of these areas has recently been carried out.

Four hundred and thirty-four new cases were taken into Court during the year. 442 cases including 193 pending from the previous year were decided and of these 380 or 86 per cent. resulted in convictions. 16,485 cases were compounded and compensation amounting to Rs. 1,57,077 was recovered in 15,925 cases, the average per case being Rs. 9·3 as compared with Rs. 9·6 in the previous year. Offenders in 560 cases were let off with a warning and in 3,491 or 15 per cent. of the total of new and pending cases the offenders were not detected.

The case with respect to forcible rescue of cattle, under the Indian Penal Code in Sind Circle, which was appealed against last year was decided in favour of the Department, the several accused persons being punished with either imprisonment or fine. Six more cases were taken to Court in Sind Circle under the Indian Penal Code during the year, the offenders being charged with assaulting forest subordinates engaged in investigation of offences of illicit cuttings and removal of forest produce and cattle trespass. Four of these resulted in convictions, one in acquittal and one is pending in the Court.

(*b*) *Protection from fire.*

The figures in the subjoined statement compare the result of the two fire seasons 1st June 1927 to 31st May 1928 and 1st June 1928 to 31st May 1929. These figures do not tally with those in Appendix 58 which are for the financial year, *viz.*, 1st April 1928 to 31st March 1929 :—

Circle	Fire season of	Area attempted to be protected	Failures	Area actually protected	Percentage of area actually protected	Cost	Cost per Square Mile protected
		Sq. M.	Sq. M.	Sq. M.		Rs.	Rs.
Northern	1928-29	3,320	89	3,231	97	16,596	5·1
	1927-28	3,334	*86	*3,248	*97	15,462	*4·8
Central	1928-29	3,652	259	3,393	93	8,552	2·5
	1927-28	3,305	214	3,091	93	8,858	2·9
Southern	1928-29	1,540	97	1,443	94	7,248	5·0
	1927-28	1,613	82	1,531	95	6,460	4·2
Sind	1928-29	493	11	482	96	592	1·1
	1927-28	492	5	487	99	230	·5
Total	1928-29	9,005	456	8,549	95	32,988	3·8
	1927-28	8,744	381	8,363	96	30,950	3·7

* The figures in the last year's report being incorrect, correct figures are given this year.

Compared with figures for the past year there has been an increase of 71 square miles in the area burnt during the year, all Circles contributing thereto. That many of these fires were intentionally started, the chief object being to get an early supply of green grass, is evident from the fact that many of them in Thana had their origin in the interior of reserved forests and especially in closed areas. Carelessness in rab burning, illicit distillation and careless smoking have also to some degree contributed to the increase. In the Panch Mahals Division as a result of the communal tension which culminated in a riot at Godhra, fires were purposely started by or at the instigation of interested villagers of opposing factions in order to inflict injury upon each other. In the Southern Circle a valuable and promising plantation 3 years old, which could not be early burnt owing to the presence of excessive grass and was therefore completely fire-traced, was wilfully set fire to from the inside by cattle owners to improve grazing. Large fires took place in young plantations of Kanara S. D. and W. D., causing considerable damage.

The Conservator of Forests, Northern Circle, reports that in spite of all the measures taken so far, forest fires have not decreased. On the other hand they have become so prevalent of late that further measures are considered necessary to bring home to the villagers the serious nature of their deliberate incendiarism. The Conservator therefore proposes that in villages in which fire-protection is bad the burnt areas should be closed to grazing for 1 year, thus making it of no avail to fire jungles for the purpose of producing early green grass. This matter is under correspondence with the Collectors in the Northern Circle.

In the Central Circle there was a marked increase in the number of fires and in the area burnt in East and North Khandesh and Satara Divisions. These are the Divisions (and also West Khandesh Division) in which suspension of communal punishment has been ordered by Government for a further period of one year. It has been reported that the attitude of the local people, in spite of the warnings given in accordance with Government Resolution, Revenue Department, No. 8654/24 dated 1st December 1928, was most indifferent in these Divisions and that help in extinguishing the fires was given only with reluctance. In West Khandesh though the number of fires and the area burnt both showed a small decrease, the Divisional Forest Officer found here also that the attitude of the villagers when fire did occur had changed for the worse.

The situation in Poona and Kolaba where communal punishment was not suspended was much better. Poona showed a decrease both in the number of fires and the area burnt. Though there was a small increase in the number of fires and the area burnt in Kolaba the figures are still below the average of the last three years.

Rewards, in the shape of turbans and silver bangles, of the value of Rs. 684 were distributed among Patels and others who had rendered help in fire and general protection in the Northern Circle. In East Thana money rewards amounting to Rs. 695 were also given to 122 villagers

who had rendered conspicuous help in extinguishing and preventing forest fires. These rewards were granted at Durbars specially held for the purpose.

In the Southern Circle 91 villages were rewarded with free or concession grazing, similar concessions being given to individuals also who had given assistance in fire protection.

Punitive measures were enforced in the Northern and Southern Circles by enhancement of grazing fees, stoppage of privileges, etc., with the Collector's approval, where the protection was bad.

The following table compares the number and origin of fires for the two financial years 1927-28 and 1928-29 (*vide* appendix 59) :—

Origin	Number of fires		Area burnt in acres	
	1928-29	1927-28	1928-29	1927-28
A. Originated in departmental fire conservancy operations.	29	31	7,723	9,810
B. Crossing exterior fire lines	202	207	104,330	23,120
C. Accidents (persons in forest)	655	565	73,883	79,245
D. Intentional accidents (persons in Forest) ..	143	103	7,293	17,746
E. Railway engines	21	24	788	2,392
F. Lightning	..	..	..	..
G. Causes unknown	1,138	807	201,895	121,080
Total ..	2,188	1,737	396,412	253,993

(c) *Protection from cattle.* (Forms Nos. 60 and 61.)

The Forest areas open and closed to grazing were as follows :—

	Sq. miles	Per cent.
Closed to all animals for the whole year	1,676	11·24
Closed to all animals for part of the year	279	1·87
Open to all animals except browsers for the whole year ..	9,412	63·15
Open to all animals except browsers for part of the year ..	..	..
Open to all animals for the whole year	3,538	23·74
Open to all animals for part of the year	..	..
Total ..	14,905	

The area open to grazing was sufficient everywhere, closure being relaxed in cases of real necessity.

The number of cattle admitted to grazing were as under :—

Circle	Horned cattle		Sheep and goats	
	1928-29	1927-28	1928-29	1927-28
Northern	652,348	664,703	134,067	126,469
Central	871,473	835,553	265,284	269,766
Southern	397,512	392,039	75,808	85,002
Sind	39,206	47,616	45,528	46,312
Total ..	1,960,539	1,939,911	520,687	527,609

Circle	Camels		Other animals		Total	
	1928-29	1927-28	1928-29	1927-28	1928-29	1927-28
Northern	..	..	1,189	1,175	787,601	742,347
Central	..	..	7,707	8,344	1,144,464	1,113,660
Southern	..	..	208	202	473,618	477,383
Sind	1,763	1,724	3,082	3,098	90,179	90,660
Total ..	1,763	1,724	12,876	12,819	2,495,862	2,422,053

There is a slight decrease in the number of cattle grazed in the Northern, Southern and Sind Circles, being chiefly due to (*a*) reduction of grazing area in consequence of disforestment in Northern Circle, (*b*) spread of rinder-pest among animals, and (*c*) low inundation and absence of rain in Sind Circle.

The grazing fee collected during the year was Rs. 5,37,072 as compared with Rs. 5,04,108 in the previous year, the value at full rates for the year under review being Rs. 22,02,893.

The number of cattle impounded for unauthorized grazing in open and closed forests is given below :—

Circle	Horned cattle		Sheep and goats	
	Open	Closed	Open	Closed
Northern	805	21,525	9,084	2,888
Central	1,505	30,117	14,891	4,667
Southern	52	6,341	1,410	5,124
Sind	817	2,319	483	3,813
Total ..	3,230	60,302	25,788	16,492
Average of 3 years from 1925-26 to 1927-28	8,039	66,027	33,442	21,415

Circle	Other animals		Total		Total of open and closed forests	
	Open	Closed	Open	Closed	1928-29	1927-28
Northern	110	337	9,988	24,750	34,738	37,178
Central	20	136	16,425	34,920	51,345	60,304
Southern	7	..	1,469	11,465	12,934	17,028
Sind	100	670	1,490	6,802	8,292	6,066
Total ..	255	1,143	29,282	77,937	1,07,219	1,22,076
Average of 3 years from 1925-26 to 1927-28	247	1,162	41,028	89,504	1,30,532	

On the whole there is a decrease in the number of impoundings. The Sind Circle shows an increase of 1,236, which was due to evasion of payment of grazing fees by Maldars. The decrease in the remaining Circles was due to the fact that (*a*) impounding was resorted to only in cases of deliberate trespass and absence of herdsmen and (*b*) good grazing was available outside forest areas owing to early rains in the Southern Circle.

(*d*) *Protection against injuries from natural causes.*

Vegetable pests.—Cutting or uprooting of climbers, lantana, prickly-pear, etc., was carried out through the medium of forest contractors and subordinates and in some parts by employing paid labour. The experiment in connection with eradication of lantana by giving out lantana areas for five years for clearing that shrub during the first two years of the lease and raising field crops in conjunction with babul during the remaining three years was continued in Poona.

There was an unprecedentedly severe frost in the Panch Mahals, Surat, Thana, West Khandesh and Poona Districts and in Sind which caused great damage to young plantations and tree growth. In the Panch Mahals frost occurred twice, the second attack being of a much more severe type than the first. Considerable damage was caused, not only to young growth but also to large trees, so much so that unless the latter revive in the rains dead wood operations will probably have to be undertaken. The frost also severely affected the lac and *babul*-pod crops which became almost total failures.

Animal pests.—Bison, sambhar, porcupines, hares, wild pigs, rats and monkeys were responsible for a normal amount of damage in young teak plantations. In Surat Division, the use of barium carbonate for poisoning rats was continued with success in rat-infected areas. In East Thana Division " Ringni " a thorny shrub was again tried and was useful in reducing the damage from hares and rats, but renders weeding difficult and expensive. Rewards offered for the destruction of porcupines, which damage *tali* (*Dalbergia sissoo*) and teak by gnawing the bark, found no claimant.

Insect pests.—Teak defoliators appeared earlier than usual and did a certain amount of damage in regeneration areas in the Northern Circle, in the Deomogra Reserve in West Khandesh, Poona and Northern Kanara Divisions. Crickets caused considerable damage to seedlings just emerging from the germinating seed in regeneration areas in S. D. Kanara, necessitating the substitution of transplants. In the older plantations in the Southern Circle the larvæ of the Phassus moth caused some damage by girdling and boring the teak sapling stems. In the sandalwood regeneration areas in Belgaum a number of sandal seedlings were damaged by a leaf insect. Measures were taken to exterminate this pest by means of a solution of paraffin.

Erosions in Sind.—An area of 22 square miles was eroded, of which about 2 square miles contained valuable timber which was exploited and sold for Rs. 15,525. Some 3 square miles were also exploited in anticipation of erosion and the resulting material was sold for Rs. 27,463.

CHAPTER III.

SYLVICULTURE.

1. Formation and Regeneration of Forests.

(i) General progress of areas under regeneration.

The general progress of areas under artificial regeneration was satisfactory except in Surat, Khandesh and Sind where the abnormally severe frost which occurred in January killed, or damaged, several thousands of well established seedlings and saplings. There was the usual damage from fire. With a view to minimise damage from fire which alone exceeds the total damage done by all agencies put together, an interesting experiment consisting in clearing a 5′ line round each regeneration plot (in addition to the exterior fire lines) was conducted in North Thana Division. This method, though limited in scope in view of the addition it necessitates to the cost of formation, was found to ensure almost complete protection of seedlings against damage from fire.

In North Thana Division where in the past pure teak plantations were raised indiscriminately irrespective of the suitability or otherwise of soil, progress is by no means uniformly satisfactory, the regeneration obtained having died, or persisted in a miserable state on water logged and otherwise unsuitable soils. During the year under review, more attention was paid to the selection of sites for teak and to the planting of a percentage of better adapted and valuable injaili species with, but in separate patches from, teak (*Tectona grandis*).

In the Southern Circle injaili growth, except where it interferes with teak, in which case it is cut back, is now carefully conserved to supplement the stocking. It is gratifying to note that in many of the older plantations in which injaili growth was indiscriminately cut an underwood of *jamba* (*Xylia xylocarpa*) is now making headway.

In Sind, the inundation of the year was low and lasted but a short period. The area flooded during the year under review was 209.581 acres compared with 403,152 acres during 1927-28 and 431,175 acres during 1926-27.

(ii) Establishment of Reproduction under Working Plans or schemes.

(a) Mainly natural.

Reproduction by coppice was satisfactory except in Surat Division where the January frost did a certain amount of damage to one year old coppice, and in West Khandesh Division where *anjan* (*Hardwickia binata*) coppiced badly. Coppice regeneration was as usual rather poor in the above-ghat forests of the Nasik District owing to the reasons given in the last year's report, *viz.*, low vitality of the parent trees, scanty rainfall and poor soil and unrestricted grazing which does not exclude even sheep and goats. In the working plan for the forests of the East Nasik Division under preparation, it is proposed to restrict grazing of browsers considerably.

Seedling reproduction during the year was normal. It may be noted that natural regeneration has at no time been such as could be depended

REGENERATION AREA FELLED IN 1929-30 TO BE REGENERATED IN JULY 1930.
A typical fireline. Area to be felled in 1930-31 in the back ground.
(Nagargali Series XIX, Regeneration Area A/4, Belgaum Division, Southern Circle.)

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upon for restocking except in the open type of forests successfully protected against fire like the Dangs and Deomogra reserve, owing to the seed being washed off steep slopes, or the ground being hard and therefore unsuitable as a natural seed bed without soil preparation. The little that comes up dies off from such causes as drip and supression, drought and grazing. In the Dangs, seedlings regeneration of teak was below the normal owing to the previous seed year being very poor. In the clear cut areas in the Dangs, teak and *tiwas* (*Ougeinia dalbergioides*) regeneration was fairly good though much below the normal.

Sandal (*Santalum album*) is spreading rapidly in lantana (*Lantana Camara*) areas east of Haliyal, in some coupes of Khanapur Range and in suitable areas throughout the Dharwar-Bijapur Division and these areas promise to be property of great value in future. In Satara Division the progress of natural regeneration in the sandal bearing areas was reported to be satisfactory.

In Sind, natural *babul* (*Acacia arabica*) regeneration was scanty on account of deficient irrigation.

(*b*) *Mainly artificial.*

Sowing of teak is now done as a mere matter of course in burnt patches in all the clear felled coupes of the Presidency proper as the chief means of regeneration or to supplement coppice. Blanks and casualties are subsequently filled by transplanting the practice of sowing and transplanting valuable injaili species like *tiwas, shiwan* (*Gmelina arborea*), *khair* (*Acacia catechu*), *hirda* (*Terminalia chebula*), etc., in the unburnt portions or burnt patches, unsuitable for teak, of the clear felled areas is being followed on an increasingly large scale in a good many Divisions. Stump planting of teak is also resorted to with success. The monsoon of the year was normal and the state of areas artificially regenerated in the last year or two would have been more satisfactory except for the abnormally severe frost in January 1929 which did fairly serious damage to seedlings in the Northern part of the Presidency and West Khandesh District. Results, though varying in different localities, are nevertheless very satisfactory having regard to the extent and distribution over the whole Presidency of the areas dealt with.

An interesting experiment initiated in Nagothna Range of the Kolaba Division 3 or 4 years ago, consisting in permitting the villagers to raise cereals in the unburnt portions of coupes provided that in return they weeded the burnt patches without any remuneration, has proved eminently successful, and the experiment has been extended to other Ranges in the Kolaba Division. The unburnt portions on which the cereal crops were raised are now clear of weeds and advantage has been taken of this fact during the last two years in planting teak stumps in such areas with the result that teak is uniformly distributed throughout the coupes so treated.

The Chief Conservator observed that in the Thana District owing to the close spacing formerly adopted the plants were too much crowded. Orders have been issued to adopt $6' \times 6'$ spacing in all future plantations.

In S. D. Kanara 52 acres and in W. D. Kanara 214 acres were successfully replanted in the existing casuarina plantations.

Babul coupes in Edlabad and Jamner Ranges of the East Khandesh Division are being sold on the agri-cum-forestry system. In Jamner Range excellent plantations of *babul* have been raised in coupes 16 and 17 of block I. In Poona Division *babul* was sown in clear cut *babul* coupes in Poona, Dhond and Khed Ranges with satisfactory results.

In Sind, 13,614 acres of exploited coupes, katchas (new accretions) and blanks were sown with 2,802 maunds of *babul*, *kandi* (*Prosopis spicigera*) and *ber* (*Zizyphus jujuba*) seed, with immediately good results which were rendered almost completely nugatory by the succeeding severe frost of January. 12,101 acres of coupes and blanks, which were not suitable for immediate regeneration owing to the soil being hard or grass bound, and of katchas which remain submerged under water to such an extent as to make the introduction of tree growth impracticable for the time being, were given out for temporary cultivation preparatory to afforestation.

Throughout the Presidency, Rs. 59,422 were spent on plantations in the organized forests and regeneration was fully completed in 38,950 acres.

(iii) Plantations and other Forms of Regeneration not under Working Plans.

Northern Circle.—1,177 *simul* (*Bombax malabaricum*) seedlings were raised in an experimental plantation in Mandvi Range. The *simul* plantation raised during 1927-28 in the East Thana Division was weeded at a cost of Rs. 130. Many of the seedlings which seemed to have died in the hot weather of 1928 revived in June and July and the total number of seedlings at the end of November 1928 was 11,331 against 25,000 places where seed was originally dibbled. Sowing of *babul*, *nim* (*Melia indica*) and *khair* in 4,800 pits yielded 3,290 seedlings, out of which only 714 seedlings survived the hot weather, the remainder having been killed by drought or grazed and trampled on by cattle.

Central Circle.—In West Khandesh Division, 36 plots covering 240 acres were treated under the agri-cum-forestry system. 30 acres in the *babul* area in the Poona Division were similarly treated, the cultivator paying an assessment of Re. 1 per acre. Eradication of lantana was done in 384 acres by agriculturist—lessees preparatory to raising their field crops for 3 years in conjunction with *babul*. No fresh areas were leased for this purpose during the year.

Southern Circle.—In N. D. Kanara about 15 acres were successfully planted up with teak $12' \times 12'$ on burnt patches, in series VI-8 worked under improvement felling. The results are exceedingly promising and this kind of work can and will be carried out on a larger scale with advantage. 25 acres were clear felled in the Nagzari valley and planted with teak $12' \times 9'$ with marked success. The teak supplemented by a good proportion of *jamba* root suckers has given complete stocking. In Kanara E. D. regeneration of teak on the sites of burnt bamboo clumps was continued with good results. In Belgaum

CLEAR FELLING FOR TEAK PLANTATIONS.

Waste logs left in depressions. Smaller debris piled in rabs down the slopes covering large proportion of the ground. Cart track below 1929 coupe.

(Laochali, Dangs, Surat Division, Northern Circle.)

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TEAK RAB SOWINGS 18 MONTHS OLD, 7′ HIGH.

Spacing 2′ × 2′ or less. A 5-feet fire trace has been cleared all round. Spacing to 6′ × 6′ to be done in 1930.

(Manor XXXIV, North Thana Division, Northern Circle.)

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TEAK FIVE SEASONS OLD.

Height 15′—18′, diameter 2″—3″. 50 per cent. of stems just removed as first thinning.

(Laochali 1924, Rab 66.)

(Dangs, Surat Division, Northern Circle.)

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AREA REGENERATED IN JULY 1927 FROM WEATHERED TEAK SEED SOWN. Gaps-ties replaced by transplants. Two-season old plants. Photo taken in April 1929. (Negative Series NIX, Teak Regeneration Area A/1, Belgaum Division, Southern Circle.)

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TWO-SEASON OLD TEAK SOWINGS (1927) WITH COPPICE ON LEFT.
(Nagargali Series XIX, Regeneration Area A/1, Belgaum Division, Southern Circle.)

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Division, sowing and planting of teak in the fuel coupes, the value of which will be considerably increased thereby, was done on a larger scale than hitherto. Sowings of sandal were done with fair success in almost 100 acres in the minor forests of Kondli in S. D. Kanara and in blocks XX and XXV of Belgaum Division. Attempts are also being made to establish sandal in the Patne Range.

Sind.—No addition was made to the *tali* (*Dalbergia sissoo*) plantations, now covering 540 acres, the maintenance of which cost Rs. 1,022 against 1,212 in 1927-28. Many of the plants up to four years of age in the Newman *tali* plantation were killed by frost. 1,425 maunds of *babul*, *kandi*, etc., seed were sown in 7,027 acres of katchas, blanks and erosion strips at a cost of Rs. 1,703.

Throughout the Presidency Rs. 15,843 were spent on regeneration work outside the working plan area, and 11,709 acres were completely regenerated. Corresponding figures for the last year (*i.e.*, 1927-28) are Rs. 24,540 and 12,607 acres.

(*iv*) *Tending.*

Weeding, cleaning, mulching and cutting back of malformed stems and of inferior *injaili* growth interfering with teak were carried out as usual. Generally weeding is necessary for at least two years in areas planted up and a cleaning in the fifth year.

(*v*) *General.*

Regeneration operations are receiving the steady and constant attention which they deserve, their technique is vastly improved and results reached generally are proportionately good.

2. Tending of the Growing Stock.

Creeper cutting was done in all Divisions. Freeing of teak, sandal and other valuable species in the Presidency, and of *babul* in Sind, was done wherever necessary. Improvement fellings were carried out in the Dangs and Kanara as prescribed. Thinnings were carried out in coupes and teak plantations according to the prescriptions of the Working Plans. In Thana 236 coupes so thinned, some sold standing and the remaining worked departmentally, brought in a net revenue of Rs. 26,051. In Kolaba, thinnings carried out in 102 coupes including 14 sold standing resulted in a net loss of Rs. 1,208 the material removed not being always saleable. In Poona Division mechanical thinnings were carried out in 20 *babul* coupes at a cost of Rs. 544 and the material extracted amounting to 15,369 cubic feet brought in a *net* revenue of Rs. 506. 146,188 cubic feet of dead and dry wood, extracted in Poona Division at a total cost of Rs. 1,740-15-0, brought in a *net* revenue of Rs. 11,812-3-0.

In Sind, intermediate fellings including thinning and removal of dead and fallen trees brought in a *net* revenue of Rs. 25,473.

In Kanara extensive thinnings and cleanings were carried out in young teak plantations. The resulting material does not always find purchasers, but the work must be done for the benefit of the ultimate crop and its value will be realised in due course.

CHAPTER IV.

EXPLOITATION.

(*a*) SYSTEMS OF MANAGEMENT.

(*i*) *Major forest produce.* (Form No. 63.)

Form No. 55 B (*vide* Volume II of this Report) shows the areas in which various systems are in force.

Clear fellings.—Were carried out in the three Thana Divisions except Igatpuri Range, Panch Mahals, in selected areas in all Ranges of the Dangs and Bulsar-Chikhli forests in the Northern Circle; Kolaba, Nawapur Nandurbar forests, and Babul forests in Poona and East Khandesh Divisions in the Central Circle, Teak pole areas of the Southern Circle generally, as also in areas selected for regeneration in the high forests of Kanara and Belgaum, casuarina plantations, and throughout the Sind forests.

Coppice with Standards.—Fellings took place as usual in the forests of Igatpuri (East Thana Division) and those of East Nasik Division, above ghat forests of Nasik and Dindori Ranges (West Nasik Division), in the Satpuda forests, anjan areas of East Khandesh, teak forest of Poona and Satara, evergreen forests of Poona and parts of Belgaum and Dharwar-Bijapur Divisions.

Improvement fellings.—Were carried out in Mandvi forests and in selected areas in the Dangs and West Nasik Division, in some coupes of North Khandesh, Satara and Kolaba Divisions and in the high forests of Kanara and Belgaum, as prescribed by the Working Plans.

Selection fellings.—In Dangs Protected forests, in some coupes of East and West Khandesh and in certain high forest areas of Kanara and Belgaum. Selection fellings have also been prescribed for Peint and below-ghat forests of Nasik and Dindori Ranges.

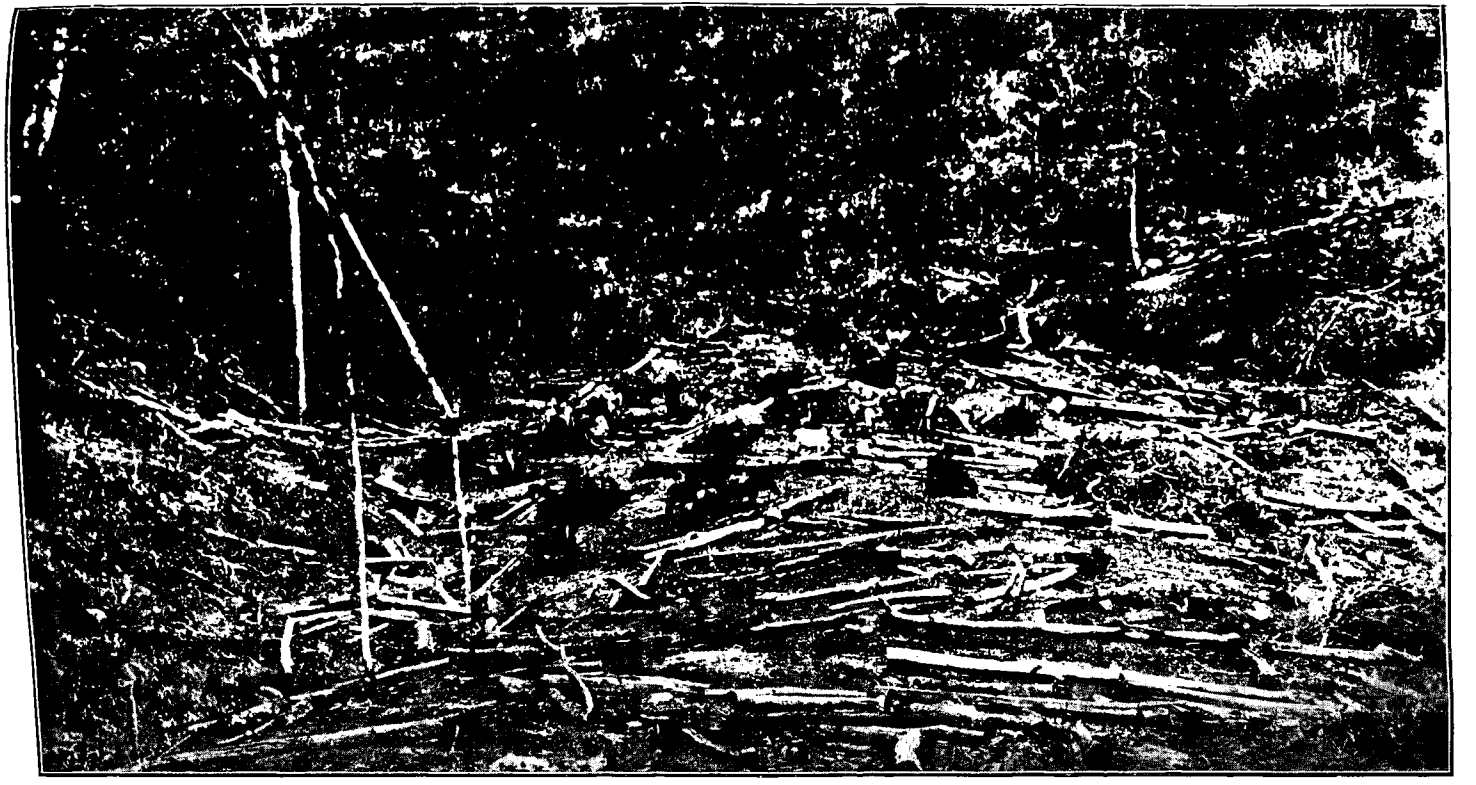
Simple coppice fellings.—Were carried out in the scrub forests of Dharwar and Kod Ranges of Dharwar district and scrub forests of Bijapur district.

Unregulated fellings.—These comprise fellings of dead and dying sandalwood, clearings for cultivation, deadwood fellings, concession fellings of matchwood species in Thana, Dangs and Kolaba, clearing of grazing grounds in Kanara E. D., exploitation of teak trees from the minor forests of Kanara Coast Division, felling of royalty trees in malki lands and of trees in erosion strips in Sind, fellings in Satara forests for the experimental manufacture of charcoal, fellings for free grants, permits, etc. They also include collection of trees uprooted in the cyclone and heavy rains of 1927 in the Panch Mahals Division.

(*ii*) *Minor Forest Produce.* (Form No. 64.)

As usual minor forest produce was mainly farmed out or sold on permits.

Hirda was collected departmentally on the share system in the Poona Division. A quantity of 122 khandies and 6 maunds of this produce was collected and sold at Rs. 63-4-0 per khandi, at a net profit of Rs. 5,987 as against Rs. 5,951 in the previous year. A small quantity of lac (7 maunds and 16 seers) was collected departmentally in



THE COLLECTION OF LOGS, WHICH HAVE BEEN BROUGHT DOWN THE STEEP SLOPES, IN THE PROCESS OF BEING CARTED.
1927 Regeneration Area (A/1) in the back ground.
(Nagargali Series XIX, Regeneration Area A/4, Belgaum Division, Southern Circle.)

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summer in Hyderabad Division but remained unsold during the year owing to its inferior quality. The winter crop of lac was destroyed by frost.

(*b*) Agency of Exploitation.

(*i*) *Departmental Agency.*

The following is a comparative statement of major and minor produce extracted departmentally during the two years 1928-29 and 1927-28 :—

Circle	Year	Major Forest Produce			
		Timber c. ft. in thousands	Fuel c. ft. in thousands	Total c. ft. in thousands	Sandal-wood value
					Rs.
Northern	1928-29 ..	517	537	1,054	16
	1927-28 ..	442	486	928	..
Central	1928-29 ..	18	803	881	4,653
	1927-28 ..	10	683	693	3,972
Southern	1928-29 ..	1,003	148	1,151	1,64,834
	1927-28 ..	922	202	1,124	1,80,875
Sind	1928-29 ..	88	2,085	2,173	..
	1927-28 ..	53	2,223	2,276	..
Total ..	1928-29 ..	1,626	3,633	5,259	1,69,503
	1927-28 ..	1,427	3,594	5,021	1,84,847
Difference ..	....	+199	+39	+238	—15,344
Percentage of total outturn from all sources ..	....	25	7	·9	100

Circle	Year	Minor Forest Produce			
		Bamboos value	Grass and grazing value	Other value	Total value
		Rs.	Rs.	Rs.	Rs.
Northern	1928-29 ..	1,111	6,485	15	7,611
	1927-28 ..	..	7,095	258	7,353
Central	1928-29 ..	607	..	7,768	8,375
	1927-28 ..	98	..	7,768	7,866
Southern	1928-29 ..	..	..	91	91
	1927-28 ..	..	..	63	63
Sind	1928-29 ..	..	..	887	887
	1927-28 ..	..	..	2,067	2,067
Total ..	1928-29 ..	1,718	6,485	8,761	16,964
	1927-28 ..	98	7,095	10,156	17,349
Difference ..	....	+1,620	—610	—1,395	—385
Percentage of total outturn from all sources ..	....	·8	·4	3	1

In the Northern Circle the increase under timber was due to more intensive fellings in Surat Division resulting in a better outturn from the Chikhalda mill. The increase under fuel was due to the Trimbak Fuel Depôt in West Nasik Division having been worked departmentally for want of contractors. The supply of bamboos for flood relief work from the Panch Mahals Division accounts for the increase under bamboos. The decrease in the value of grass was due to a less quantity of grass being delivered by the monopoly grass contractors during the year than in 1927-28.

The increase under timber in the Central Circle was chiefly due to the working of a coupe in Poona Division on a share system and that under fuel was due to thinning operations carried out departmentally in Poona and Kolaba Divisions. The increase in the value of minor produce was due to the departmental felling of dead and dying bamboos in Mahableshwar Range, Satara Division.

In the Southern Circle the increase under timber was chiefly due to greater activity on the part of contractors and also to the exploitation of timber under the Ankola-Ramanguli Plan. The decrease in the outturn of fuel was due to the extraction of fuel having been curtailed during the year as there was sufficient stock of the previous year remaining unsold. The decrease under sandalwood was due to a smaller quantity of saleable sandalwood being obtained from trees exploited during the year.

The increase in the outturn of timber in Sind Circle was due to the increased demand for babul logs from Messrs. Gilders and Company, Bombay. The decrease in fuel was due to the small area of erosion cut departmentally and also to fewer coupes having been worked departmentally owing to slackness of the market. The decrease in the value of minor produce is due to a smaller quantity of lac having been collected during the year and the same not having been sold on account of its inferior quality.

Timber depôts.—The average prices realized at the annual Depôt sales in the Northern and Southern Circles are compared in the following table :—

Northern Circle.

Kind of timber	Average rate per khandi of 12·5 C. ft.					
	Jharya Depôt		Nasik Depôt (Badgi mill)		Nasik Depôt (Haste mill)	
	1928-29	1927-28	1928-29	1927-28	1928-29	1927-28
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Boards ..	20 6 10	29 8 10	25 12 6	36 4 2	40 13 1	37 11 1
Battens ..	15 7 11	13 1 4	14 1 0	18 6 3	18 12 0	13 12 10
Scantlings, etc. ..	33 5 4	29 12 0	27 5 6	27 4 5	26 15 3	31 4 3

LOADING LOGS ON CARTS FROM THE DUMP.

(Nagargali Series XIX, Regeneration Area A/4, Belgaum Division, Southern Circle.)

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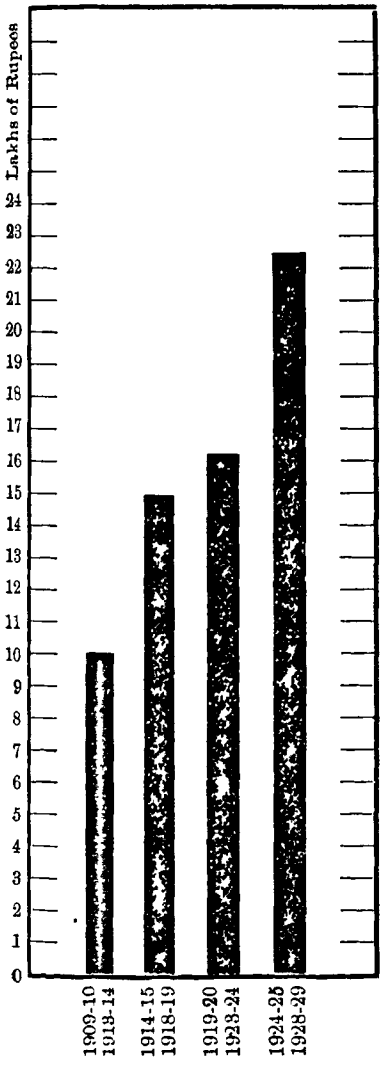
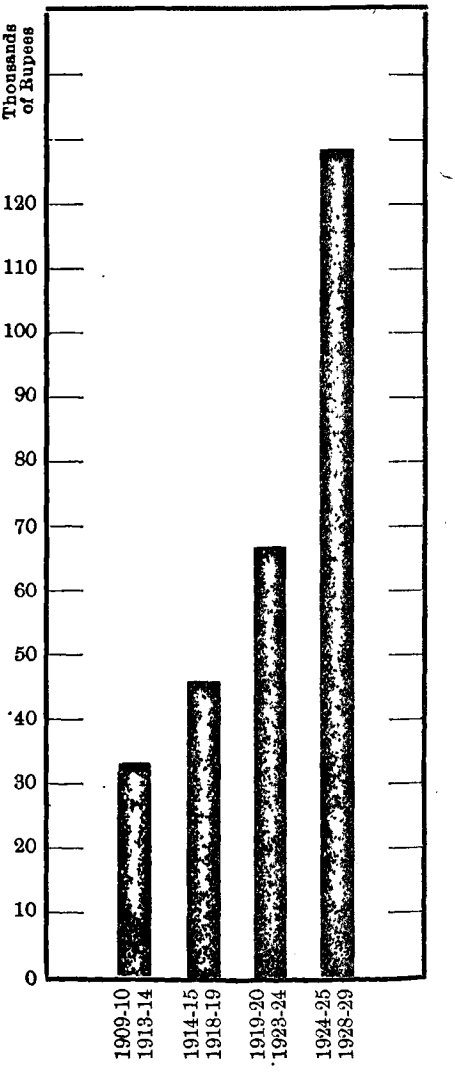
Average annual value of Timber and Sandalwood extracted departmentally during the four quinquennia commencing from 1909-10

TIMBER



NOTE.—The annual value has increased from Rs. 9,93,903 in the quinquennium 1909-10 to 1913-14 to Rs. 22,24,942 in the quinquennium 1924-25 to 1928-29.

SANDALWOOD



NOTE.—The annual value has increased from Rs. 32,504 in the quinquennium 1909-10 to 1913-14 to Rs. 1,27,081 in the quinquennium 1924-25 to 1928-29.

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Southern Circle.

Logs	Average rate per khandi of 12·5 C. ft.			
	Dandeli above-ghat Depôt		Kodibag Depôt	
	1928-29	1927-28	1928-29	1927-28
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Teak	41 0 0	33 0 0	30 4 0	26 0 0
Matti	17 0 0	9 8 0	18 4 0	17 0 0
Nana	19 10 0	11 0 0	10 3 0	....
Honne	34 9 0	9 0 0	20 7 0	20 0 0
Sissum	24 0 0	13 0 0	25 1 0	20 0 0
Karimuttal	23 1 0	....	....	....
Kindal	....	9 0 0	....	....
Heddi	18 2 0	9 0 0	....	....
Other junglewoods	9 14 0	....	....	....

Logs	Average rate per khandi of 12·5 C. ft.					
	Hattikeri Depôt		Divgi Depôt		Kirwatti Depôt	
	1928-29	1927-28	1928-29	1927-28	1928-29	1927-28
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Teak	28 9 0	23 0 0	....	22 0 0	30 12 0	23 0 0
Matti	19 12 0	15 0 0	....	....	15 6 0	7 0 0
Nana	....	11 0 0	....	....	....	5 0 0
Honne	21 6 0	19 0 0	....	....	21 4 0	14 0 0
Sissum	29 2 0	18 0 0	20 5 0	15 0 0	9 0 0	7 0 0
Karimuttal	....	....	....	....	27 8 0	....
Kindal	....	....	....	....	....	6 0 0
Heddi	....	....	....	....	13 10 0	9 0 0
Other junglewoods	....	....	....	....	....	....

The prices obtained in the Northern Circle were on the whole satisfactory. Those received in the Southern Circle for both teak and junglewoods were excellent and showed a substantial rise over those of recent years.

Firewood Depôts.—All fuel depôts in the Northern Circle, except the one at Trimbak, which was run departmentally for want of contractors, were worked by contractors. In the Central Circle the depôt at Matheran was worked departmentally and those at Panchgani and Mahableshwar

were worked by contractors. All firewood depôts in the Kanara District excepting those at Karwar, Sadashivgad and Majali were worked by contractors.

Mechanical extraction and transport of timber and Government saw mills are dealt with in Chapter IV-A.

Private Saw mills.—Mr. Sayad Nasrodin's mill at Hanmapur turned out 3,945 sleepers and 8,345 cubic feet of other sawn material. Unfortunately the mill yard having caught fire in January about 1,600 sleepers and 300 khandies (75 tons) of sawn wood were lost in the fire. The cause of the fire is not known.

Cart Depôts.—There is only one cart depôt, at Kirwatti in Kanara District, which is maintained for the transport of touring officers' kit and in connection with departmental timber and road works. The account of the depôt shows a net loss of Rs. 36 during the year which is due mainly to insufficient demand for carts by touring officers. The carts will in future be continuously employed on departmental works when not in demand by touring officers and it is expected that this will result in a clear profit hereafter.

Messrs. Howard Brothers Timber Agency.—The account with this firm to the end of the financial year is given the following statement :—

Description of timber	Receipts	Disposals	Balance in stock	Sale proceeds
	C. ft.	C. ft.	C. ft.	£ s. d.
Teak	22,616	22,616	....	
Matti	11,419	10,956	463	
	t. c. q. lbs.	t. c. q. lbs.		
Blackwood or rosewood ..	29 4 3 3	29 4 3 3	....	13,330 4 1
	C. ft.	C. ft.		
Honne	76	76	....	

Description of timber	All charges on sales	Other charges, freight, prime charges, etc	Net proceeds	Remarks
	£ s. d.	£ s. d.	£ s. d.	
Teak				
Matti				
Blackwood or rosewood ..	2,120 0 7	6,840 2 7	4,370 0 11	
Honne				

No further shipments were made to London during the year under report.

LOADING LOGS ON CARTS BY MEANS OF AN IMPROVISED CRANE.
(Working Series XIX, Regeneration Area A/4, Belgaum Division, Southern Circle.)

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(ii) Purchasers.

The following table compares the outturn of major and minor produce removed by consumers and purchasers during the years 1928-29 and 1927-28 :—

Circle	Year	Major Forest Produce				
		Timber		Fuel		Sandalwood
		C. ft. in thousands	Value	C ft. in. thousands	Value	Value
			Rs.		Rs.	Rs.
Northern ..	1928-29 ..	2,502	17,62,473	5,371	29,471	..
	1927-28 ..	2,019	16,26,250	5,765	25,440	2
Central ..	1928-29 ..	669	3,14,416	8,601	71,776	1,000
	1927-28 ..	627	2,87,307	4,579	62,888	..
Southern ..	1928-29 ..	1,170	2,07,954	6,516	2,07,509	..
	1927-28 ..	956	2,48,142	6,372	2,05,551	..
Sind ..	1928-29 ..	119	82,562	16,886	2,71,340	..
	1927-28 ..	131	82,382	16,046	3,25,432	..
Total ..	1928-29 ..	4,550	24,57,405	37,374	5,80,096	1,000
	1927-28 ..	3,733	22,44,081	32,762	6,19,306	2
Difference ..		+817	+2,13,324	+4,612	−39,210	+998

Circle	Year	Minor Forest Produce			
		Bamboos value	Grass and grazing value	Other minor produce value	Total value
		Rs.	Rs.	Rs.	Rs.
Northern ..	1928-29 ..	78,256	1,27,003	55,555	2,60,814
	1927-28 ..	59,552	1,24,768	45,786	2,30,106
Central ..	1928-29 ..	14,617	5,10,170	64,923	5,89,710
	1927-28 ..	11,897	6,00,776	53,949	6,66,622
Southern ..	1928-29 ..	78,283	87,755	70,090	2,36,128
	1927-28 ..	74,627	88,243	61,885	2,24,755
Sind ..	1928-29 ..	..	40,573	43,565	84,138
	1927-28 ..	..	38,767	34,578	73,345
Total ..	1928-29 ..	1,71,156	7,65,501	2,34,133	11,70,790
	1927-28 ..	1,46,076	8,52,554	1,96,198	11,94,828
Difference ..		+25,080	−87,053	+37,935	−24,038

In the Northern Circle the increase in the revenue from timber and fuel was due to better prices received for Thana coupes, as they were on the whole better stocked than was the case last year, and also to a slight rise in the timber market. There was a better demand for bamboos, the rates for which were increased in some localities. The rise under minor

forest produce was due to better prices realized for grass and some minor produce farms and also to recovery of grazing fees on a larger number of outside cattle.

In the Central Circle the increase in the outturn and value of timber and fuel was due to the sale of arrear raiwal (junglewood) coupes and disposal of teak in the demarcation line in the Poona Division and to keen competition in the sales of Kolaba Division. The greater demand for bamboos in East Khandesh accounts for the rise under "Bamboos", while the fall under "Grass and Grazing" was due to the fact that in the previous year arrear rent for Military kurans was recovered. The increase under other minor produce was due to better prices realized during the year.

In the Southern Circle the increase in the outturn of timber and fuel with a corresponding increase in value was principally due to the improved market for fuel and teak pole coupes and for the valuable improvement and regeneration fellings in Belgaum. Better prices were obtained for *Hirda* and *Shigekai* (*Acacia concinna*) farms in Western Division Kanara and Belgaum and this mainly accounts for the increase under minor produce.

In the Sind Circle the increase in the value of timber is small and needs no explanation. There was poor demand for coupes and those sold fetched comparatively low prices. This accounts for the decrease in the value of fuel. The rise under minor forest produce was mainly due to better prices realized for babul pods, reeds, grasses, etc.

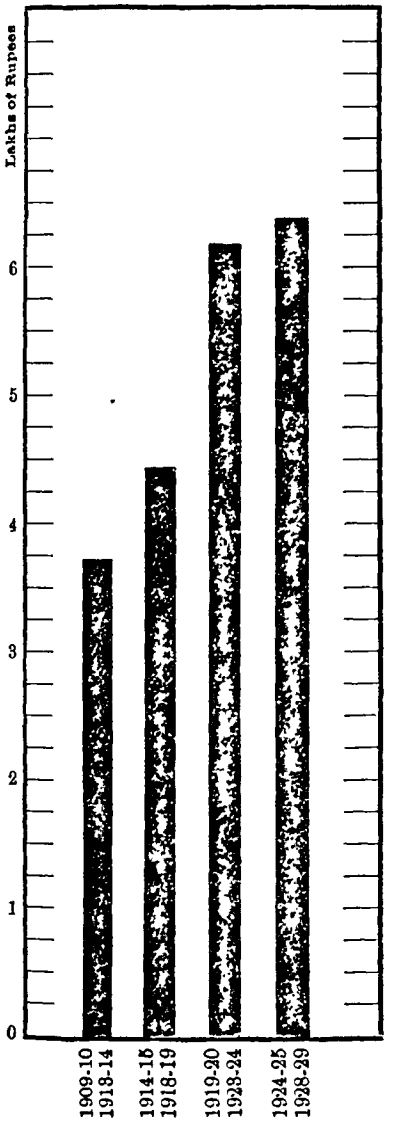
(*iii*) *Rights, Privileges and Free grants.*

The following is a comparative statement of the quantity and value of forest produce removed by right and privilege holders and free grantees during the years 1927-28 and 1928-29 :—

Circle.	Agency.	Major Forest Produce			
		Timber		Fuel	
		C. ft. in thousands	Value	C. ft. in thousands	Value
			Rs.		Rs.
Northern	C	....	....	4,460	1,02,83[illegible]
	F	12	9,809	....	....
Central	C	....	....	898	27,380
	F	9	5,131	19	901
Southern	C	300	72,000	3,000	37,500
	F	23	8,270	121	1,538
Sind	C	....	....	12	157
	F	6	1,031	15	4
Total, 1928-29 ..	C	300	72,000	8,370	1,67,[illegible]39
	F	50	24,241	155	2,443
Total, 1927-28 ..	C	300	72,000	10,270	3,05,617
	F	79	28,204	31	873

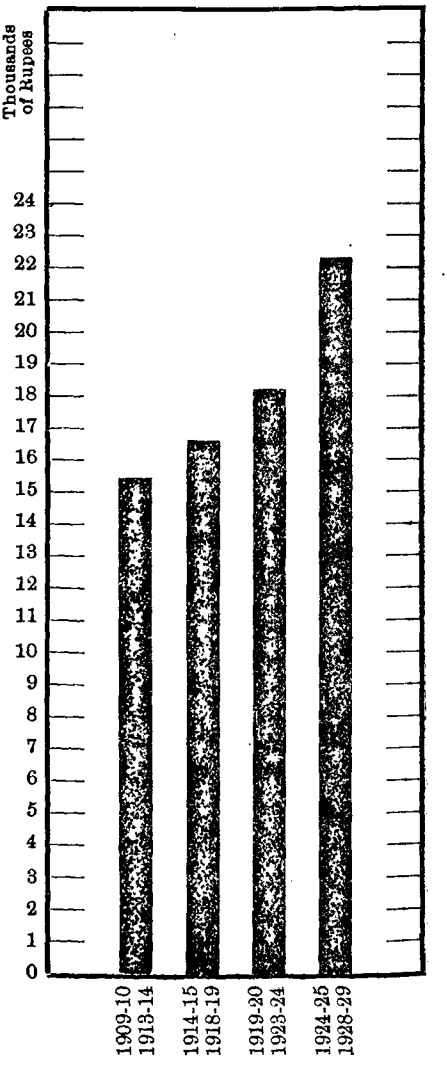
Average annual value of Fuel and Minor Produce removed by purchasers during the four quinquennia commencing from 1909-10

FUEL



NOTE.—The annual value has increased from Rs. 3,70,515 in the quinquennium 1909-10 to 1913-14 to Rs. 6,35,754 in the quinquennium 1924-25 to 1928-29.

MINOR PRODUCE EXCLUDING GRASS AND GRAZING



NOTE.—The annual value has increased from Rs. 1,54,325 in the quinquennium 1909-10 to 1913-14 to Rs. 2,24,298 in the quinquennium 1924-25 to 1928-29.

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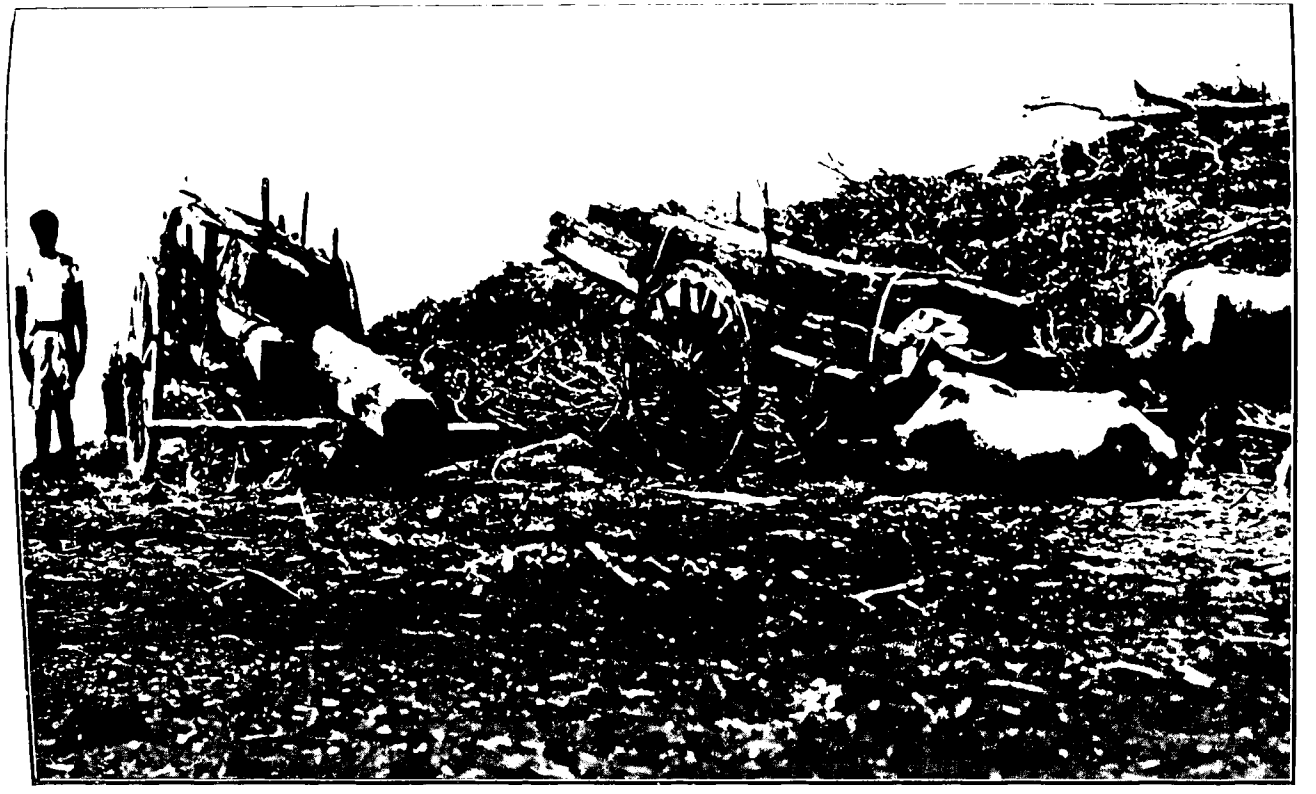

LOGS AWAITING TRANSIT.

(Nagargali Series XIX, Regeneration Area A/4, Belgaum Division, Southern Circle.)

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Circle	Agency	Minor Forest Produce			
		Bamboos value	Grass and grazing value	Other minor produce value	Total value
		Rs.	Rs.	Rs.	Rs.
Northern	C	4,437	3,04,270	17,443	3,26,150
	F	96	....	9	105
Central	C	286	98,948	5,098	1,04,332
	F	68	100	4,284	4,452
Southern	C	45,000	2,84,339	20,000	3,49,339
	F	815	6,896	1,890	9,601
Sind	C	....	6,192	....	6,192
	F	....	8,504	2	8,506
Total, 1928-29 ..	C	49,723	6,93,749	42,541	7,86,013
	F	979	15,500	6,185	22,664
Total, 1927-28 ..	C	50,019	6,90,001	35,614	7,75,634
	F	2,771	25,750	5,797	34,318

C—Concessionists. F—Free Grantees.

There are no rights except those of way. Privileges are regulated by local rules and orders and these were exercised by the villagers as usual in all Circles. Lists of privileges are drawn up in the several vernaculars of the Presidency and are being widely published among the villagers concerned as ordered by Government. Free grants of timber and other forest produce were given in deserving cases for construction and repair of dwellings, for hutting and other domestic and agricultural purposes.

(c) Outturn and Sources of Forest Produce.

The outturn from all sources of forest produce during the two years 1928-29 and 1927-28 compares as follows :—

Circle	Year	Major Forest Produce		
		Timber C.ft. in thousands	Fuel C.ft. in thousands	Sandal-wood
				Rs.
Northern	1928-29	3,121	10,368	16
	1927-28	2,473	11,678	2
Central	1928-29	696	10,381	5,653
	1927-28	648	7,420	3,972
Southern	1928-29	2,496	9,785	1,64,834
	1927-28	2,212	9,586	1,80,875
Sind	1928-29	213	18,983	....
	1927-28	206	18,282	....
Total ..	1928-29	6,526	49,517	1,70,503
	1927-28	5,539	46,666	1,84,849
Difference ..		+987	+2,851	−14,346

Circle	Year	Minor Forest Produce		
		Bamboos	Grass and grazing	Other minor produce
		Rs.	Rs.	Rs.
Northern	1928-29	83,900	4,37,758	73,022
	1927-28	94,717	4,41,009	58,240
Central	1928-29	15,578	6,09,218	82,073
	1927-28	14,447	6,03,548	69,402
Southern	1928-29	1,24,098	3,78,990	92,071
	1927-28	1,90,800	3,92,864	83,459
Sind	1928-29	....	55,269	44,454
	1927-28	....	47,919	36,655
Total ..	1928-29	2,23,576	14,81,235	2,91,620
	1927-28	1,08,964	15,75,400	2,47,765
Difference ..		+24,612	−94,165	+43,855

Of 2,495,855 animals admitted to grazing in the forests, 473,618 were allowed free. Corresponding numbers for the last year were 2,482,063 and 540,633.

The total expenditure on management of State forests was—

Circle	1928-29	1927-28
	Rs.	Rs.
Northern	4,77,925	5,08,164
Central	1,28,192	1,12,977
Southern	11,64,205	11,09,480
Sind	91,229	98,441
Total ..	18,61,551	18,29,062

The increase was due to more expenditure on communications and buildings in the Central Circle and on departmental exploitation in the Southern Circle.

CHAPTER IV-A.

THE ENGINEERING BRANCH.

The work of the Engineering Division during the year included the following :—

(1) Surveys, (2) Designs and Drawing Office work, (3) Road and Bridge construction, (4) Forest exploitation—(*a*) Mechanical extraction, (*b*) Saw Mills.

1. Survey Work.

Northern Circle.

Mokhada-Assa Road—West Nasik Division .. 8 miles.
Kumshet-Assa Road, Do. .. 2⅛ miles.

SANTALUM ALBUM (SANDALWOOD).

Final trimming of sapwood off rough trimmed billets and root pieces. Shavings collected on sacking. Sapwood chips can be seen behind the workmen.

(Khanapur Depôt, Belgaum Division, Southern Circle.)

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Babul timber logs extracted for the Gun Carriage Factory, collected at and being loaded and transported from Bindi Dhariya Forest Depôt (in the Shikarpur Division) to the Sukkur Station.

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Southern Circle.

Only one mile was surveyed in the Nagzhari Valley (Compartment 25) for a tractor road for the next season, and in addition, inspection of about 10 miles of the Valley was made for the same purpose.

2. Design and Drawing Office Work.

(*a*) *Buildings.*

The usual plans and estimates were supplied for all works called for by the Forest Department. Several estimates were checked and scrutinized.

Improvements to the special design for a strong room at Ahwa were completed. The design for a Kacheri at Ahwa has been received back for completion according to local rates. This work has been taken in hand and is nearing completion.

Standard Type Designs for Forest buildings were completed and approved by Government. They are now being printed.

(*b*) *Roads.*

Plotting and estimating of the Trimbak-Kumshet road (17 miles) was taken in hand, and

drawings and estimates for the Dara-Dhadgaon road (deviation 2nd section) were completed.

3. Construction.

(*a*) *Roads.*

The following culverts, etc., were constructed by the Engineering Division :—

	Expenditure in 1928-29.
	Rs.
(1) Bridges on Gund-Kaneri-Dandeli road ..	5,437
(2) Special repairs to the Tamange Ghat road ..	10,209
(3) Drainage works on Kadra-Shivpur road ..	1,732
(4) Bridge over Gund Nalla	1,685

Supervision of construction work on the Dara-Dhadgaon road (North Khandesh) was in charge of this Branch. Repairs to washouts on Tamange Ghat road were carried out at the cost of Rs. 1,500.

(*b*) *Buildings.*

No buildings were constructed by this Department this year. Special repairs to the temporary quarters for the engineering subordinates were carried out at a cost of Rs. 862.

Inspection of the foundations of the guards quarters at Amboli (Poona Division) was made as requested by the Divisional Forest Officer.

4. Forest Exploitation.

(a) *Mechanical Extraction.*

(i) *Fordson Outfit.*

Tractor skidding was carried out in the Nagzhari Valley Compartment 24 with Fordson outfits as last year. One outfit worked for the whole season and a 2nd outfit started work on 4th April 1929.

The cost of exploitation including all charges worked out to Rs. 16-0-7 per ton against Rs. 8-14-0 per ton for ordinary hauls and Rs. 21-12-0 for long haul work last year.

As the 2nd outfit worked only for a short period the total output during the year (November 1928 to June 1929) was 809·41 tons against 1,259 tons last year. Practically all work done this year was *long haul work.*

The higher costs of extraction are due to the following reasons :-

(*a*) Longer lengths of hauls -average length of haul this year was 1,566 feet against 840 feet last year and maximum length of haul this year was 3,150 feet against 2,700 feet last year.

(*b*) Difficult nature of the ground steeper slopes with rocky out crops were met with in this year's work which added to the difficulties of operations.

(*c*) The logs for skidding were distributed over a larger area and the average size of timber extracted this year being smaller than the previous years resulted in reduced output per haul as compared to last year.

(*d*) 84·62 tons of timber were re-hauled for the convenience of carting. This extra work while adding to the cost did not add to the total output.

(*e*) Mechanical breakdowns were somewhat more frequent than last year.

The chart facing this page shows the costs of skidding for the years 1923-24 to 1928-29.

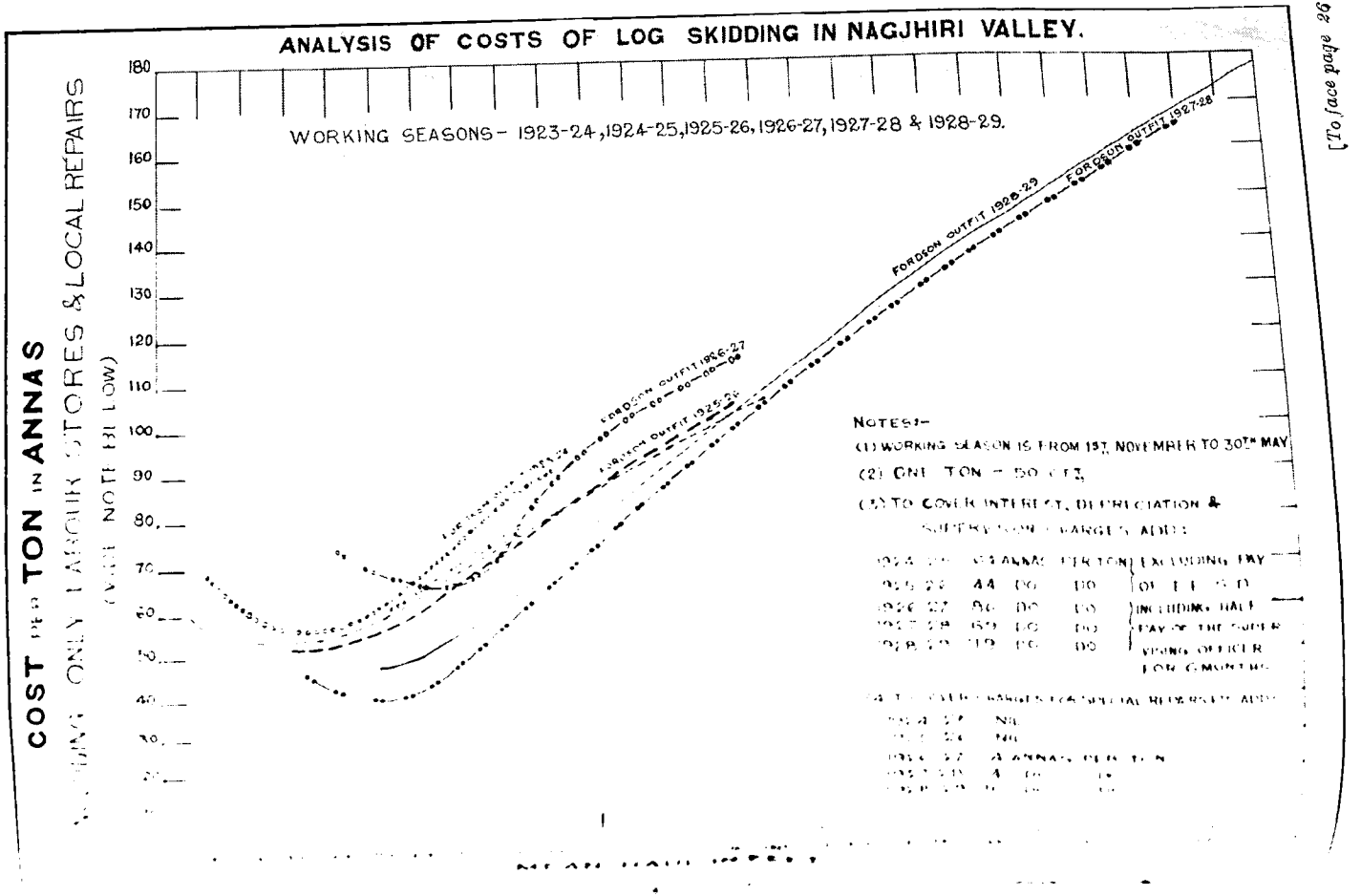
(ii) *Animal Winch at Kulgi.*

This outfit worked in Nagzhari Compartment 24. It skidded 409·56 tons of timber during the year. The average length of haul was 914 feet and work was carried on from 8th November 1928 to 14th April 1929. Last year the Winch worked from 16th November 1927 to 29th February 1928, and skidded 371 tons of timber, the average length of haul being 708 feet.

The working cost including all charges worked out to Rs. 11-12-7 per ton as compared to Rs. 10-8-9 last year.

(iii) *Animal Winch at Gund.*

This outfit worked on the steep slopes in Gund Range, from 25th November 1928 to 8th March 1929. Last year, the Winch started work on 30th October 1927 and closed on 2nd June 1928. The seasons output amounted to 236·14 tons of timber at a cost of Rs. 13-0-6 per ton as against 354 tons extracted last year at a cost of Rs. 12-2-0.



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The two Fordson outfits worked under the Forest Engineer. The Ranger lent to the Engineering Division and appointed as skidding Overseer did good work.

There was one major breakdown on the outfits which resulted in the stoppage of all work for six days. Necessary repairs were however effected as quickly as was possible under the circumstances.

(*b*) *Sawmills.*

1. *Preliminary.* The following sawmills were worked departmentally by the Forest Department during 1928-29 :—

1.	Jungle sawmill at Dandeli (N. D., Kanara)	}	Southern Circle.
2.	Foden portable sawmill in N. D., Kanara		
3.	Jungle sawmill at Bomanhalli (N. D., Kanara)		
4.	Do. at Kirwatti (E. D., Kanara)		
5.	Do. at Badgi (Peint)	}	Northern Circle.
6.	Do. at Haste (Peint)		
7.	Do. at Chikalda (Dangs)		

The large Dandeli mill is engaged principally on special M. & S. M. Railway indents and the supply of metre gauge teak railway sleepers. For the former it has to saw timber ordinarily saleable in the long. While for the latter, special sleeper pieces are sawn, these being obtained in the course of logging operations of the North Kanara Division. The Foden portable and Bomanhalli sawmills did sleeper cutting work only. The Kirwatti sawmill (in Eastern Division, Kanara) does mainly sleeper cutting work although a few occasional railway and private indents are also executed by this mill. It is proposed to increase the activity of this mill, for which purpose an American breakdown rack bench capable of handling large size timbers has been erected.

The three sawmills in the Northern Circle saw mainly waste timber from the fellings, *i.e.*, they convert the remnants and odd lengths of branch-wood and unsound stem-wood left over in a felling area after all timber worth extracting in the log has been removed from the coupes.

2. *General.*—In the year under report the steady progress in sawmilling activity of the Department noticed last year has been maintained. The general principles mentioned in the last year's report have been adhered to and improved upon wherever practicable. This has resulted in keeping down the sawing costs. The total output is less than last year for the reasons dealt with later in this paragraph.

The following figures show the development of sawmilling during the last five years :—

Year	Total output of sawn timber in cubic feet
1924-25	313,000
1925-26	308,000
1926-27	388,660
1927-28	417,480
1928-29	334,753

The decrease in output is noticed in the following sawmills :—

Name of the mill	Output in 1927-28	Output in 1928-29	Difference (*minus*)
	Cubic feet.	Cubic feet.	Cubic feet.
1. Dandeli mill	145,445	132,050	13,395
2. Bomanhalli mill	90,014	46,501	43,513
3. Foden portable mill		No record	
4. Kirwatti mill	51,471	33,817	17,654
5. Badgi mill	36,440	29,827	6,613
6. Haste mill	34,740	30,336	4,404

On the other hand Chikalda mill shows increase in output.

Name of the mill	Output in 1927-28	Output in 1928-29	Difference (*plus*)
	Cubic feet.	Cubic feet.	Cubic feet.
Chikalda mill	59,370	62,222	2,852

The causes for these increases and decreases in the output of the various mills are analysed below.

(*a*) *Dandeli Mill.*—This mill is not working up to its full capacity. The American Log-mill was not worked for practically the whole year; and two other benches were employed for part of the year in the preparation of wooden railway keys. Output of these keys is not entered in the above figures. The outturn of this sawmill, (up to the limit of its full capacity), always depends on the number of railway indents and sleeper contracts secured by the mill. It does not pay to saw up good logs for stock sizes.

(*b*) *Bomanhalli Mill.*—This is principally a railway sleeper conversion mill. Out of the four saw benches in this sawmill two were transferred for use with the Foden portable sawmill, thus reducing the capacity of this mill by half. The mill was finally closed down in the end of January 1929 for want of raw material for sawing.

(*c*) *Foden portable Mill.*—This mill worked only for a very short period at Kulgi and no record of this experimental work was maintained.

(*d*) *Kirwatti Mill.*—This mill is situated in a very malarious locality and there is always a long absentee list, accounting for fluctuations in its output. The mill was kept closed for nearly one month for erecting a new log-mill. This has also contributed to the fall in output.

(*e*) *Badgi Mill.*—The slight decrease in the output of this sawmill is due to the fact that available raw material supply was coming to an end

in the locality. The mill has been closed down on 22nd May 1929 for want of such supplies. Mostly old material was sawn up during the latter part of the financial year with a resultant higher percentage of waste and decreased output.

(f) *Haste mill.*—This mill also showed a slight decrease in output. It is due to the inefficiency and inexperience of the Foreman in charge. The Foreman's services have been terminated and a better hand has been appointed in his place.

(g) *Chikalda mill.*—Increase in the output of this mill is attributable to the addition of one ball bearing bench, (transferred from Karanjada), to this mill; and is also due to the enthusiasm and energy of the present Ranger in charge of the mill. The mill was kept closed for 31 days during the last monsoon for want of timber for sawing and this period was utilized for overhauling the machinery and engine.

3. *Summary of costs of conversion.*—The following statement compares the cost of conversion for the last five years :—

Year	Average cost of conversion of sawn timber (stores, establishment and labour) excluding depreciation and interest
1924-25	7·71 annas per cubic foot.
1925-26	6·12 ,, ,, ,, ,,
1926-27	5·82 ,, ,, ,, ,,
1927-28	4·98 ,, ,, ,, ,,
1928-29	5·42 ,, ,, ,, ,,

The reasons for a slight increase in sawing costs of under ½ anna per cubic foot during the current year as compared with last year are discussed below :—

Sawing cost per cubic foot on account of	1927-28		1928-29	
Stores	1·21	annas.	1·22	annas.
Labour	3·00	,,	3·20	,,
Establishment	0·77	,,	1·00	,,
Total ..	4·98	annas.	5·42	annas.

From the above it will be seen that charges on account of stores are nearly the same. This is what would be expected under efficient management as the consumption of stores would be proportional to the number of hours the machines are worked and, *within certain limits*, would be independent of the output.

On the other hand charges on account of labour and establishment are slightly higher than last year although considerably less than previous

years. This is due to the decreased output and the higher total labour and establishment charges for the year, because of the general tendency of the labour rates to rise.

4. *Dead stock.*—The dead stock in each sawmill has been checked with the registers and the latter corrected and maintained up-to-date. Copies of these registers are kept in the Forest Engineer's Office. This facilitates transfer of special tools and of spare parts and surplus tools and machines.

Total value of dead stock added to all mills during the year is Rs. 9,061.

5. *Stores.*—The standardisation of quality and methods of distribution of stores mentioned in last year's report have been adhered to and improved upon wherever practical experience has indicated the desirability of change in methods.

All stores supplied to the sawmills are of the best approved quality while this item's share in cost of conversion is lower than was the case in previous years.

Last year one Calcutta firm sent some saw blades for test. The saw blades were tested and results noticed in last year's report. During the year under report another Calcutta firm of manufacturers sent their belting for test in our sawmills. The test piece sent by them being of wrong size was returned to the manufacturers who have now supplied a test piece of the proper size. The test is in progress and its results will be noted in the next year's report. The total value of stores issued to various sawmills during the year was Rs. 25,536.

6. (*a*) *New sawmills.*—No new sawmill was added. The Foden portable sawmill added to North Kanara Division last year was not heavily employed for most of the year.

One American short log tiemill (break down rack bench) was added to Kirwatti sawmill.

Chikalda sawmill was expected to be transferred to Sunda in the Kharpi valley during the year under report; but the mill was retained in its present position for another year. It is to be transferred next year.

(*b*) *Sawmills scrapped.*—Bomanhalli sawmill was closed down at the end of January 1929. The engine of this mill was transferred to Kirwatti mill. Two benches and some useful tools are reserved for use with the Foden portable mill. The remaining machinery has been advertised for sale.

Kirwatti mill old engine is also advertised for sale.

The Badgi mill closed since the end of the financial year may be reinstalled if a suitable site is found elsewhere in the Northern Circle.

7. *Special repairs and improvements.*—All machines and millgearing of each sawmill have been kept in good working order. Timely repairs have been carried out and arrangements made for supplies of spare parts from Europe and from Dapuri, Hubli and Dandeli workshops.

Any particularly difficult work of Northern Circle sawmills machinery is carried out at the Government Public Works Department Workshops at Dapuri and that of the Southern Circle mills at Hubli Railway Workshops; while ordinary repairs work, specially of the Southern Circle mills, is done at Dandeli workshop. Maintenance of this workshop is necessary both for sawmill repairs and for the machine skidding and tractor logging operations of the Nagzhari valley.

The following special repairs were carried out during the year :—

Dandeli mill.—The old Dandeli mill shed was repaired and extended by 4 bays. A new 24' length of shaft pit was erected for taking one extra saw bench and a band saw for railway key cutting work. The new pedestals and shafting provided for the purpose have however not yet been fitted.

The vertical frame saw bench was dismantled and all worn out and broken parts were sent to Hubli railway shops for repairs. These have not yet been received back. Oxy-acetylene welding of the Fowler Loco boiler plate suggested by the Boiler Inspector was carried out by a special mechanic of Hubli railway shops.

Bomanhalli mill.—New main bearing brasses of Bomanhalli mill engine specially imported from England were fitted to the engine and a few boiler tubes were renewed.

Kirwatti mill.—At Kirwatti the whole lay out of the mill was changed and the old mill machinery along with the new American rack bench was erected according to a revised lay out. This opportunity was taken for substituting a new main line shaft and new C. I. swivel self oiling bearings in replacement of the old shaft and bearings, which were badly scored, the latter being also slightly out of true. The engine transferred from Bomanhalli mill was overhauled and erected in this mill, the old engine of this mill (which was not powerful enough to take the increased load) being laid aside for sale. Negotiations for its sale are in progress. This mill requires one extra bench to convert the side cuts of the log mill. The extra bench is available from the deadstock of the Bomanhalli mill advertised for sale but it would require a still more powerful engine than the present one to take the increased load.

An improvement was made in the design of the sharpening machine of this mill. Special steel pivot bearings were designed and fitted to this machine. They are a great improvement over the old gun-metal bearings. A self centering saw-collar was also designed and fitted to this machine.

Chikalda mill.—The log mill was speeded up and a new ball bearing bench was erected in place of the band saw which was removed and is advertised for sale.

8. *Sharpening, tensioning and care of saw blades.*—The saw blades are the most important and expensive item of sawmill stores. On their proper sharpening and care depends the output and efficiency of a sawmill. This has been impressed on the Foremen. Except at Kirwatti and Haste sawmills, the saw blades were looked after properly. At these two

mills the profile of the tooth was unsuitable for sawing hard woods and this was brought to the notice of the Foremen at the time of inspections.

Another matter that needs serious attention is the rather heavy casualty list (due to buckling, cracking and loss of tension) of saw blades used on the sleeper cutting benches of our sawmills. Many of the sleeper pieces that are cut on such benches are of a diameter beyond the capacity of the saw with the result that the saw gets completely buried in the cut. Very often it gets stuck due to the binding action of a fresh cut timber. This causes slip in the belt drive and consequent heavy strain on the belt, the bearings of the bench and the countershaft. The saw itself gets overheated on account of friction and this causes loss of tension. In addition, many sleeper pieces are of most irregular shape and in order to get any useful outturn from them at all, the feed sometimes, has to be slightly on a curve and not along the plane of rotation of the saw blade. This has been prohibited as it is the most fruitful cause of buckling and cracking of saw blades. Proper solution of this problem is to use a break down rack bench or a horizontal broad band saw for the first cut in the case of large size timbers. The log mill at Dandeli could do this work ; but it is closed down at present as a measure of economy. A new log mill is erected at Kirwatti and this should solve the problem so far as that mill is concerned.

In order to maintain the maximum depth of cut for each bench and also the proper peripheral cutting speeds of saw blades, inserted-tooth saws have been introduced in three sawmills of the Department. Their use is still in the experimental stage. They have not so far proved to be very successful chiefly due to the improper temper of the teeth (bits). It has been suggested to the makers to manufacture specially for our mills, special hard high speed steel bits. One firm has agreed to supply such teeth for test and as soon as these are received further tests will be carried out.

Retensioning of saw blades that have lost tension in use is not done efficiently as we have no specially trained hand at present. The Foremen at Chikalda and Kirwatti who have shown special aptitude for this work are being trained for that purpose.

9. *Hand Cross-cut saws.*—American cross-cut saws introduced in sawmills are doing very good work both in the mill depôts and in the fellings. Formerly a stock of these saws was maintained at the central stores at Dandeli, but now as a measure of economy, the saws are ordered out only against a specific indent from the Divisional Forest Officers.

10. *Timber seasoning.*—In order to increase the storage space for seasoning sawn timber, a seasoning shed (type No. 2) has been transferred from Bomanhalli to Dandeli mill.

In the Northern Circle only Haste mill is provided with a seasoning shed. In the other mills temporary storage sheds are provided to store timber pending carting to the sale depôts.

Statement A given below compares the outturn and costs of working under various heads for the year 1926-27, 1927-28 and 1928-29.

TABLE A.

Name of Mill	Output during the year in c. ft.			Average sawing costs per c. ft. in annas — Stores		
	1926-27	1927-28	1928-29	1926-27	1927-28	1928-29
Dandeli Mill ..	1,27,755	1,45,445	1,32,050	1·31	1·08	0·91
Foden Portable .			No record	is kept.		
Bomanhalli Mill..	61,679	90,014	46,501	0·94	0·94	0·91
Kirwatti Mill ..	41,514	51,471	33,817	1·46	1·26	1·80
Badgi Mill ..	38,423	36,440	29,827	1·68	1·87	1·87
Haste Mill ..	29,530	34,740	30,336	1·45	1·47	1·77
Chikhalda Mill ..	53,410	59,370	62,222	1·61	1·46	1·29
Karanjara Mill ..	36,349	....	....	1·69	....	....
For all the Mills .	3,88,660	4,17,480	3,34,753	1·41	1·21	1·22

Average sawing costs per c. ft. in annas—*contd.*

Name of Mill	Labour			Establishment			Total excluding depreciation and interest		
	1926-27	1927-28	1928-29	1926-27	1927-28	1928-29	1926-27	1927-28	1928-29
Dandeli Mill ..	3·69	3·53	3·61	0 71	0·62	0·68	5·71	5·18	5·20
Foden Portable .				No	record	is kept.			
Bomanhalli Mill..	2·91	2·27	2·45	1·15	0·77	1·39	5·00	3·98	4·75
Kirwatti Mill ..	2·92	2·31	2·35	0·80	0·58	0·97	5·18	4·15	6·12
Badgi Mill ..	3·83	3·77	3·73	0·95	1·01	1·24	6·46	6·65	6·34
Haste Mill ..	3·47	2·88	2·90	1·01	0·92	1·10	5·93	5·27	5·77
Chikhalda Mill ..	3·25	3·00	2·67	1·08	1·09	0·98	5·94	5·55	4·94
Karanjara Mill ..	3·60	..	..	0·94	..	..	6·60	..	..
For all the Mills .	3·47	3·00	3·20	0·94	0·77	1·00	5·83	4·78	5·42

Total capital cost of all saw mills working in this presidency up to 31st March 1928 .. .. Rs. 2,68,183

Depreciation at 5 per cent. on original cost $\frac{5 \times 2,68,183}{100}$ .. .. ,, 13,409.

Present book value of all saw mills on 1st April 1928 .. .. .. ,, 1,79,402

Interest at 6 per cent. on present value $\frac{6 \times 1,79,402}{100}$ .. .. .. ,, 10,764

Total charges on account of depreciation and interest .. .. .. ,, 24,173

Cost per cft. on account of depreciation and interest Rs. $\frac{24,173 \times 16}{3,34,753}$ .. As. 1·15

Total cost of production including all charges (but excluding royalty on timber) As. 6·57.

Note.—All employees who do manual work are included under "labour" while skilled supervisors, clerks and others who normally do no manual work are included under "establishment."

It will be noticed that the Bomanhalli, Kirwatti and Haste mills show a considerable increase in sawing costs. The reasons for this have been already explained.

The Dandeli sawmill is debited in trading accounts for the value of logs taken by the mill for conversion. The rate charged is the average of the previous year's sale figures. As private purchasers of timber at Dandeli Depôt are given free delivery of logs at the railway station it is reasonable that the cost of carting logs from the depot to the mill yard should not be debited against the mill. In the above calculations, however, half the cost of carting logs from the depôt to mill yard has been included. These charges are peculiar to Dandeli mill as the sale depôt at this place is extensive in area. In other saw mills raw material is brought from the forest direct to the mill yard.

The factors that affect conversion costs have been dealt with in detail in last year's report. One of the principal factors is the output of the mill. As shown graphically in last year's report reduction in output results in considerable increase in conversion costs. This is what would be expected as labour and establishment bill of each mill is practically constant and is not dependent on the amount of work done. Lower output would therefore increase sawing costs under these heads, and this makes clear the necessity of maintaining a constant high rate of output. All factors which tend to affect this (*viz.*, sufficient and regular supply of timber for the sawmills, sufficient amount of labour and stores and proper and expeditious arrangements for repairs of the machines which go out of order) should be and are carefully watched.

12. *Accidents, etc., and safety precautions taken to avert them.*—There was no serious accident in any of the sawmills during the year under report.

Two different types of saw-guards were experimentally fitted on four benches in the Dandeli sawmill. The type that was found to offer least obstruction to handling of timber was selected for use in all the sawmills. The required number of saw-guards was ordered out through the Indian Stores Department, Delhi, but the deliveries were not completed during the financial year.

13. *Organization.*—There is still room for improvement in the organization of the mill labour. Labour costs in some of the mills are higher than they should be. During the year under report there is a rise in labour charges of annas 0·44 per cubic feet and reasons for this rise are discussed above.

Lower output in some cases is not so much due to shortage of hands or laziness or lack of skill of the operators as to want of proper organization of the available labour. The steady progress in the output and consequent lower sawing cost of Chikhalda mill during the last three years is the result of good organization and control of labour.

Another cause of lower output is lack of regularity and despatch in the supply of saw blades. To minimize this defect duplicate saw sharpening machines have been provided in the larger mills.

The stores organization is efficient. The central stores at Dandeli supplies to all mills all important stores which are purchased wholesale through the Chief Controller of Stores. In the case of articles like emery wheels which are likely to be damaged in transit, handling is minimised by arranging their supply to the mills direct from the Controller. Oils and lubricants which cannot be stored in bulk are purchased from the manufacturers' Agents at Bombay and supplied direct to each mill. At each mill a small store room is installed and all receipts and issues of stores are properly accounted. The balances of the stores in hand are also checked at each inspection.

The layout of the Dandeli mill leaves a good deal to be desired. This mill has simply grown by additions made to it from time to time with the result that it now has a very peculiar and congested layout. Unconverted timber enters this mill at both ends and finished produce and waste material are collected right in the centre of the mill. Removal of these requires expensive manual handling. In a properly designed saw mill the raw produce enters at one end and the waste products and the finished material leave at the other end. In such a layout the transport of the material through the shops is done, as far as possible, with the aid of labour saving mechanical devices (like live roller ways, dead roller ways, gravity trolleys, etc.).

In the layout of all the newly erected saw mills (*e.g.*, Chikhalda, Kirwatti) this object has been kept in view and cross handling of material is avoided as much as possible. Revision of the lay out at Dandeli is under consideration.

14. *Establishment.*—The work of mill establishment and of Rangers connected with the milling work was satisfactory.

15. *Mill Trading Accounts.*—The results of the year's mill work are shown in the subjoined account sheets.

Trading account of the Chikhalda Saw Mill for the year 1928-29.

Capital cost Rs. 64,642 + Rs. 805 — 27,041 = 38,406.

Expenditure	Rs.	Rs.	Income	Rs.	Rs.
I. Timber (unconverted) ..		57,629	I. Sales		1,41,021
(a) Stock at the end of the previous year 2,498 pieces, 23,395 cubic feet at Re. 0-8-0 per cubic foot.	11,697		Sale of sawn material during the year—51,042 cubic feet.	1,16,200	
(b) Taken over during the year for conversion—23,567 pieces, 132,014 cubic feet at Re. 0-8-0 per cubic foot.	66,007		*Less*—Stock of timber at the end of previous year 11,153 cubic feet.	18,718	
Total ..	77,704			97,572	
Less—			*Add*—		
(c) Stock on hand at the close of the year—4,758 pieces, 40,150 cubic feet at Re. 0-8-0 per cubic foot.	20,075		Stock of sawn timber at the end of the year—19,450 cubic feet.	44,040	
			Miscellaneous ..		7,341
II. General stores ..		6,105			
(a) Stock at the end of the previous year.	2,500				
(b) Expenditure during the year.	6,105				
Total ..	8,605				
Less—					
(c) Stock at the end of the year.	2,500				
III. Establishment ..		10,918			
IV. Labour		6,786			
V. Depreciation at 5 per cent. on Machinery and at 4 per cent. on shed, etc., on capital cost.	3,067				
	132	3,199			
VI. Interest at 5·41 per cent. on capital cost—38,160.		2,064			
VII. Repairs to buildings ..		..			
VIII. Miscellaneous ..		12,796			
(a) General	140				
(b) Carting sawn material to sale depot.	12,656				
Profit for the year ..		49,465			
Total ..		1,48,962	Total ..		1,48,962

Trading account of the Badgi Saw Mill for the year 1928-29.

Capital cost Rs. 17,925 + 47 − 6,193 = Rs. 11,779.

Expenditure			Income		
	Rs.	Rs.		Rs.	Rs.
I. Timber (unconverted) ..		31,283	I. Sales		49,803
(a) Stock at the beginning of the year, viz., 9,185 cubic feet at Re. 0-8-0 per cubic foot.	4,592		Sale of sawn timber during the year 24,807 cubic foot at Rs. 2-0-9 per cubic foot.	50,798	
(b) Taken over during the year for conversion, viz., 67,341 cubic feet at Re. 0-8-0 per cubic foot.	33,671		*Less*—		
			Stock of sawn timber at the end of the previous year, viz., 30,846 cubic feet at Rs. 2-2-11 per cubic foot (sale price of 1927-28).	67,315	
Total ..	38,263			—16,517	
Less—			*Add*—		
Stock on hand at the end of the year, viz., 13,960 cubic feet at Re. 0-8-0 per cubic foot.	6,980		Stock of sawn timber at the end of the year, viz., 35,934 cubic feet at Rs. 2-0-9 per cubic foot (sale price for 1928-29).	66,320	
II. General stores ..		2,626			
(a) Stock at the end of the previous year.	5,494				
(b) Expenditure during the year.	2,626		II. Miscellaneous ..		350
	8,120		Loss for the year ..		5,044
Less—					
Stock on hand at the end of the year.	5,494				
III. Establishment—					
(a) Temporary ..	2,310				
(b) Permanent ..	1,482				
		3,792			
IV. Supervision charges..		438			
V. Labour (coolies on the mill).		6,958			
VI. Depreciation on capital expenditure of Rs. 17,926.		817			
VII. Interest on capital cost Rs. 12,549 at 5·41 per cent.		679			
VIII. Repairs to Buildings.		88			
IX. Miscellaneous ..		553			
X. For carting sawn material.		7,003			
Total ..		55,197	Total ..		55,197

Trading account of the Haste Saw Mill for the year 1928-29.

Capital cost Rs. 27,606 – Rs. 5,712=21,894.

Expenditure			Income		
	Rs.	Rs.		Rs.	Rs.
I. Timber (unconverted) ..		34,333	I. Sales		56,701
(*a*) Stock at the beginning of the year, *viz.*, 128,711 cubic feet at Re. 0-8-0 per cubic foot.	64,356		Sale of sawn timber during the year 19,915 cubic feet at Rs. 2-2-9 per cubic foot.	43,285	
(*b*) Taken over during the year for conversion, *viz.*, 83,831 cubic feet at Re. 0-8-0 per cubic foot.	41,915		*Less*—		
Total ..	1,06,271		Stock of sawn timber at the end of the previous year, *viz.*, 29,779 cubic feet at Rs. 2-6-4 per cubic foot (sale price of 1927-28).	71,346	
				—28,061	
Less—			*Add*—		
Stock on hand at the end of the year, *viz.*, 143,876 cubic feet at Re. 0-8-0 per cubic foot.	71,938		Stock of sawn timber at the end of the year, *viz.*, 40,103 cubic feet at Rs. 2-2-9 per cubic foot, sale price for 1928-29.	84,762	
II. General stores ..		3,447			
(*a*) Stock at the end of the previous year.	8,327		II. Miscellaneous receipts.		4,274
(*b*) Expenditure during the year.	3,447				
	11,774				
Less—					
Stock on hand at the end of the year.	8,327				
III. Establishment—					
(*a*) Temporary ..	2,048				
(*b*) Permanent ..	1,231				
		3,279			
IV. Supervision charges.		219			
V. Labour (coolies on the mill).		5,498			
VI. Depreciation on capital expenditure of Rs. 27,606.		1,335			
VII. Interest on capital cost Rs. 23,229 at 5·41 per cent.		1,257			
VIII. Repairs to buildings.		55			
IX. Miscellaneous ..		452			
X. For carting sawn material.		8,406			
Profit for the year ..		2,694			
Total ..		60,975	Total ..		60,975

Trading account of the Bomanhalli Saw Mill for the year 1928-29.

Capital cost Rs. 25,236+24=25,260—10,434=Rs. 14,826.

Expenditure			Income		
	Rs.	Rs.		Rs.	Rs.
I. Timber (unconverted) ..		18,483	I. Sales		1,11,481
(a) Stock at the end of the previous year 2,144 cubic feet at various rates.	810		Sale of sawn material during the year 52,611 cubic feet.	1,22,217	
(b) Taken over during the year for conversion 63,064 cubic feet at various rates.	17,737		*Less*— Stock of sawn material at the end of the previous year 51,813 cubic feet.	1,15,585	
Total ..	18,547			6,632	
Less— Stock on hand at the end of the year 127 cubic feet at Re. 0-8-0 per cubic foot.	64		*Add*— Stock of sawn material at the end of the year 47,533 cubic feet.	1,04,849	
II. General stores ..		3,111			
(a) Stock at the end of the previous year.	..		II. Miscellaneous ..		32
(b) Expenditure during the year.	3,111				
Less— Stock at the end of the year.	..				
III. Establishment ..		12,857			
IV. Labour		1,204			
V. Depreciation at 5 per cent. on capital expenditure Rs. 25,236 for 10 months.		1,052			
VI. Interest at 5·41 per cent. on Rs. 15,854 for 10 months.		715			
VII. Repairs to buildings ..		31			
VIII. Miscellaneous ..		13,245			
Profit for the year ..		60,815			
Total ..		1,11,513	Total ..		1,11,513

Trading account of the Dandeli Saw Mill for the year 1928-29.

Capital cost (Rs. 1,03,907+1,264=1,05,171—47,203)=57,968.

Expenditure			Income		
	Rs.	Rs.		Rs.	Rs.
I. Timber (unconverted) ..		2,28,526	I. Sales		4,54,070
(*a*) Stock at the end of the previous year.	..		Sale of sawn material during the year 125,313 cubic feet.	4,43,700	
(*b*) Taken over during the year for conversion 187,912 cubic feet at various rates.	2,28,526		*Less*—		
			Stock of sawn timber at the end of the previous year 40,027 cubic feet.	1,14,807	
Total ..	2,28,526			3,28,893	
Less—					
(*c*) Stock on hand at the end of the year.	..				
II. General stores ..		9,101	*Add*—		
(*a*) Stock at the end of the previous year.	..		Stock of sawn material at the end of the year 46,768 cubic feet.	1,25,177	
(*b*) Expenditure during the year.	9,101		II. Miscellaneous ..		3,381
Total ..	9,101				
Less—					
(*c*) Stock at the end of the year.	..				
III. Establishment ..		33,858			
IV. Labour		5,569			
V. Depreciation on capital expenditure and for Foden outfit for 15 days.		4,643			
VI. Interest at 5·41 per cent.		3,353			
VII. Repairs to buildings ..		1,140			
VIII. Miscellaneous ..		418			
Profit for the year ..		1,70,843			
Total ..		4,57,451	Total ..		4,57,451

Trading account of the Kirwatti Saw Mill for the year 1928-29.

Capital cost Rs. 9,930+Rs. 450=10,380—8.367=2,013.

Expenditure	Rs.	Rs.	Income	Rs.	Rs.
I Timber (unconverted) ..		45,015	I. Sales		90,473
(a) Stock at the end of the previous year.	20,951		Sale of sawn material and price of sleepers supplied to Madras and Southern Maratha Railway Co.	89,739	
(b) Taken over during the year for conversion.	55,637				
Total ..	76,588				
Less			*Less*—		
(c) Stock on hand at the end of the year.	31,573		Stock of sawn timber, etc., at the end of the previous year.	36,257	
II General stores ..		3,880		53,482	
(a) Stock at the end of the previous year.	..		*Add*—		
(b) Expenditure during the year.	3 880		Stock of sawn material at the end of the year.	36,991	
Total ..	3,880		II. Miscellaneous ..		407
Less					
(c) Stock at the end of the year.	..				
III Establishment ..		10,070			
IV. Labour		152			
V Depreciation on Capital expenditure Rs. 9,930 at 5 per cent.		497			
VI Interest at 5·41 per cent on Rs. 1,563.		85			
VII Repairs to buildings ..		20			
Miscellaneous ..		3,825			
Profit for the year ..		26,727			
Total ..		90,880	Total ..		90,880

The mills on the whole show a net profit of Rs. 3,05,500 as against Rs. 3,35,916 last year, the Northern Circle showing Rs. 14,408 more and the Southern Circle showing Rs. 44,824 less profit than last year. Badgi Saw Mill showed a loss of Rs. 5,041 against the profit of Rs. 24,929 last year while Chikhalda Saw Mill shows a profit of Rs. 49,465 against the loss of Rs. 20,462 last year. Haste Saw Mill in the Northern Circle and all the three saw mills in the Southern Circle showed profits.

5. General.

Proposals for making permanent some of the subordinate appointments in the Engineering Branch are under the consideration of Government.

CHAPTER V.

FINANCIAL RESULTS.

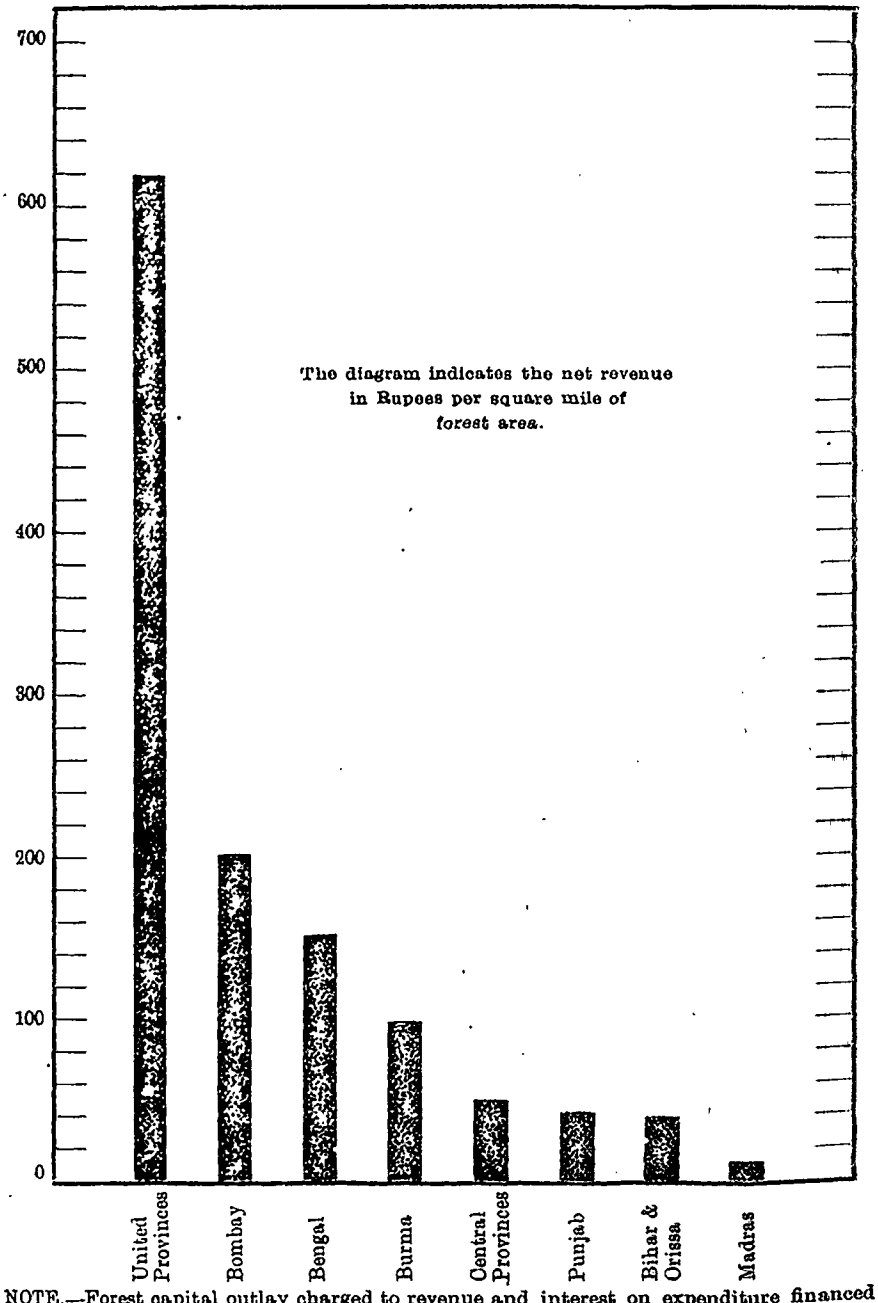
(Forms Nos. 68, 69 and 70.)

The revenue and expenditure of the year compare with those of the last year and the average of the previous quinquennium 1923-24 to 1927-28 as follows :—

Circle	Year	Revenue	Expenditure				Surplus or deficit	Percentage of surplus to gross revenue
			Conservancy and works	Forest Capital outlay charged to revenue	Establishment	Total		
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Northern	1928-29	25,45,075	3,05,597	1,39,897	6,72,146	11,77,640	13,67,435	53·7
	1927-28	23,03,903	4,03,403	1,42,091	6,72,945	12,18,439	11,75,464	49·1
	Average	25,31,072	4,16,512	67,699	6,58,602	11,42,213	13,88,859	54·9
Central	1928-29	12,22,430	1,06,318	41,307	5,80,223	7,27,038	4,94,591	40·5
	1927-28	12,40,372	1,22,606	37,018	5,82,168	7,41,882	4,98,490	40·2
	Average	13,37,360	1,09,058	14,363	5,73,916	6,97,337	6,40,013	47·8
Southern	1928-29	29,52,478	10,08,009	66,345	6,23,347	17,87,701	11,64,777	39·5
	1927-28	29,37,085	10,51,204	58,883	6,18,136	17,28,223	12,08,862	41·2
	Average	28,05,986	11,01,012	38,004	6,37,537	17,77,153	10,28,833	36·6
Sind	1928-29	6,54,783	87,877	3,352	2,96,101	3,87,330	2,67,453	40·8
	1927-28	7,14,209	94,961	3,480	2,99,463	3,97,904	3,16,305	44·3
	Average	7,06,980	1,00,622	2,837	2,85,999	3,89,458	3,17,522	44·9
General Direction including Bombay Forest College.	1928-29	..	(a) 42,036	115	(b) 93,585	1,36,335	−1,36,335	..
	1927-28	54	43,348	114	86,603	1,30,065	−1,30,011	..
	Average	1,685	21,889	101	1,04,122	1,26,062	−1,24,377	..
Engineering	1928-29	1,830	30,838	−21,015	43,530	52,757	−50,927	..
	1927-28	254	46,357	1,922	42,041	90,320	−90,066	..
	Average	2,633	46,700	10,317	87,698	1,44,715	−1,42,082	..
Total Presidency.	1928-29	73,76,605	17,31,269	2,29,491	23,08,941	42,69,701	31,06,904	42·1
	1927-28	72,85,877	17,61,960	2,43,508	23,01,356	43,06,833	29,79,044	40·9
	Average	73,85,706	17,95,743	1,33,921	23,47,274	42,76,938	31,08,768	42·1
Difference between.	1928-29 and 1927-28	+90,728	−30,700	−14,017	+7,585	−37,132	+1,27,860	..

N.B.—The above figures are exclusive of expenditure under BVI work advances which are recoverable.
(*a*) Includes Rs. 42,421 on account of interest on past capital expenditure not charged to revenue.
(*b*) Includes Rs. 219 on account of loss by exchange

This diagram compares the Net Revenue during 1927-28 per unit of forest area in the various provinces of India and Burma



NOTE.—Forest capital outlay charged to revenue and interest on expenditure financed from loan funds has been taken into account in arriving at the net revenue.

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The gross revenue of the year rose by Rs. 90,728 over the figures of the previous year and fell by Rs. 9,101 as compared with the average of the preceding five years. The rise was in the Northern and Southern Circles counterbalanced by fall in the Central and Sind Circles. The surplus of the year exceeded that of last year by Rs. 1,27,860 and was less than the average of the previous quinquennium by Rs. 1,864.

The increase in revenue in the Northern and Southern Circles is explained as follows :—

Northern Circle.—The increase is chiefly due to improvement in the timber market, as a result of which the coupes sold during the year fetched better prices. There was also a better demand for bamboos and other minor produce, which contributed to the increase to some extent. The Surat Division shows a continued rise in gross and nett revenue in direct relation to the opening up of the country by road construction and improvement. The early execution of approved road schemes in Peint is an urgent necessity for carrying out exploitation fully under the revised working plan.

Southern Circle.—The increase is attributed to better prices realized from the annual depôt timber sales, also from hirda and shigekai farms in W. D. Kanara, sale of old timber and sawn wood at Hattikeri, increased output of sleepers and sale of khair trees for the manufacture of catechu in C. D. Kanara, better prices obtained for teak pole coupes and hirda farm in Belgaum Division and for coupes and sandalwood in Dharwar-Bijapur Division.

The decrease in revenue in the Central Circle is chiefly accounted for by the fact that the revenue for grass and grazing was inflated in 1927-28 owing to recovery of five years' arrear rent for Military kurans in Poona Division. The decrease in Sind Circle is mainly due to non-sale of some coupes and of departmentally cut fuel, and low realizations from coupes that were sold owing to the congested state of fuel market and lack of outside demand for fuel already in stock with contractors.

On the whole there has been a decrease in the expenditure under "B—Conservancy and Works". Chief reasons for this are :—

(1) non-supply of woollen clothing to Foresters and guards in all Circles owing to late receipt of orders from Government.

(2) Less quantity of timber than in the previous year was exploited departmentally owing to the proposed closing down of the saw mill at Badgi in West Nasik Division.

(3) Departmental works were curtailed in Sind on account of unfavourable market conditions and no departmental collection of lac was undertaken, the produce being farmed out to contractors.

Expenditure under "52-A—Forest Capital Outlay", which shows on the whole a decrease during the year, varies according to the programme of works sanctioned every year.

The increase in expenditure under "C—Establishment" is small and chiefly due to annual increments of pay granted during the year.

The sources of revenue and the heads of expenditure are analysed

Sources and heads	General Direction	Forest Engineer	Northern Circle
REVENUE.	Rs.	Rs.	Rs.
Ia and IIa. Timber	....	....	21,41,804
Ib and IIb. Firewood	....	....	33,725
Ic and IIc. Bamboos	....	....	79,367
Id. Sandalwood	....	....	16
IId. Grazing and grass	....	....	1,27,003
Ie and IIe. Other produce	....	....	62,055
III. Drift and Confiscated forest produce ..	....	....	157
IV. Forests not managed by Government ..	....	....	1,466
V. Miscellaneous	....	1,830	1,01,778
Refunds ..	....	....	−2,296
Total ..	....	1,830	25,45,075
EXPENDITURE.			
B.—Conservancy and Works.			
I. Timber, etc., extracted by Government agency ..	....	9,791	1,97,346
II. Timber, etc., extracted by consumers or purchasers.	....	....	33,506
III. Maintenance, Repairs and Renewals, 52-AI—Livestock, stores, tools and plant, and 52-AII—Communications and buildings.	122	−806	1,77,317
IV. Conservancy and Regeneration and 52-AIII—Organisation, Improvement and extension of Forests.	....	....	57,592
V. Miscellaneous	207	233	39,733
Interest	42,421	....	....
Total ..	42,750	9,218	5,05,494
ESTABLISHMENTS.			
I. Pay of Officers	44,913	9,645	1,15,428
II. Pay of establishments	13,712	20,805	4,33,468
III. Allowances, etc.	26,860	10,051	1,01,267
IV. Contingencies	2,281	3,035	21,983
Establishment charges payable to Central Government.	5,600	....	....
Loss due by exchange	219	....	....
Total ..	93,585	43,539	6,72,146
Grand Total ..	1,36,335	52,757	11,77,640
Surplus 1928-29	−1,36,335	−50,027	+13,67,435
Surplus 1927-28	−1,30,011	−90,066	+11,75,464
Difference	−6,324	+39,139	+1,91,979

and compared below :—

Central Circle	Southern Circle	Sind Circle	Total		Increase or decrease
			1928-29	1927-28	
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
3,25,082	22,32,925	1,00,134	47,99,045	46,38,266	+1,61,679
1,22,487	2,21,228	8,03,038	7,70,478	7,85,861	−15,383
15,225	78,313	....	1,72,905	1,46,174	+26,731
4,995	1,69,521	....	1,74,532	1,80,895	−6,363
5,10,170	87,755	40,573	7,05,501	8,52,554	−87,053
72,692	70,180	43,566	2,48,493	2,11,541	+36,952
1,672	741	327	2,807	3,828	−931
24,500	15	....	25,081	24,824	+1,157
1,64,064	96,021	77,726	4,41,419	4,61,378	−19,959
−18,448	−4,221	−581	−25,546	−19,444	−6,102
12,22,439	29,52,478	6,54,783	78,76,605	72,85,877	+90,728
17,963	9,41,515	67,814	12,34,420	12,18,693	+15,736
14,259	5,862	574	54,201	50,614	+3,587
55,927	1,54,760	11,318	3,98,688	4,29,864	−31,226
21,217	51,655	4,061	1,36,525	1,42,329	−5,804
38,340	8,562	7,462	94,546	1,20,928	−26,382
....	....	....	42,421	43,049	−628
1,47,715	11,64,354	91,220	19,60,760	20,05,477	−44,717
91,898	1,04,576	62,024	4,28,484	4,43,697	−15,213
3,76,050	4,06,806	1,65,383	14,10,224	14,01,381	+14,843
91,816	93,682	53,174	3,76,853	3,74,481	+2,372
20,459	18,283	15,520	81,561	75,379	+6,182
....	....	....	5,600	5,600	....
....	....	....	219	818	−599
5,80,223	6,23,347	2,96,101	23,08,941	23,01,356	+7,585
7,27,938	17,87,701	3,87,330	42,69,701	43,06,833	−37,132
+4,94,501	+11,64,777	+2,67,453	+31,06,904	....	....
+4,98,490	+12,08,862	+3,16,305	....	+29,79,044	....
−3,989	−44,085	−48,852	....	....	+1,27,860

The revenue and expenditure are further analysed as follows :—

Class	General Direction and Forest Engineer		Northern Circle	
REVENUE.	Rs.	Per cent.	Rs.	Per cent.
Major Produce	..	..	21,75,545	85
Minor Produce	..	..	2,68,425	11
Miscellaneous	1,830	100	1,03,401	4
Refunds	..	..	—2,296	..
Total ..	1,830	..	25,45,075	..
EXPENDITURE CONSERVANCY AND WORKS AND 52-A.				
Extension and Constitution ..	..	..	734	..
Improvement	—23,361	—45	2,25,774	45
Exploitation	32,468	62	2,66,176	53
Miscellaneous	440	1	12,810	2
Interest	42,421	82	..	..
Total ..	51,968	..	5,05,494	..
ESTABLISHMENT.				
Administrative	75,071	56	43,169	6
Executive	23,755	17	1,79,057	27
Protective	37,398	27	4,49,920	67
Total ..	1,37,124	....	6,72,146	....

Central Circle		Southern Circle		Sind Circle		Total	
Rs.	Per cent.	Rs.	Per cent.	Rs.	Per cent.	Rs.	Per cent.
4,52,564	37	26,23,674	89	4,93,172	75	57,44,955	78
5,98,087	49	2,36,248	8	84,139	13	11,86,899	16
1,90,236	15	96,777	3	78,053	12	4,70,297	6
−18,448	−1	−4,221	..	−581	..	−25,546	..
12,22,439	..	29,52,478	..	6,54,783	..	73,76,605	..
..	..	79	..	..	..	813	..
72,409	49	1,87,763	16	13,598	15	4,76,243	24
56,420	38	9,68,020	83	70,169	77	13,93,253	71
18,826	13	8,492	1	7,462	8	48,030	3
..	..	..	..	..	..	42,421	2
1,47,715	..	11,64,364	..	91,229	..	19,60,760	..
48,275	8	51,923	8	47,781	16	2,67,119	12
1,03,719	28	1,82,067	29	39,300	13	5,87,898	25
3,68,229	64	3,89,357	63	2,09,020	71	14,53,924	63
5,80,223	..	6,23,347	..	2,96,101	..	23,08,941	..

The expenditure incurred during the year from the provision under 52-A—Capital Outlay on forests, subsequently charged to Revenue is as shown below :—

Heads	General Direction	Northern Circle	Central Circle	Southern Circle	Sind Circle	Forest Engineering Branch	Total
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
I. Livestock Stores, etc. ..	115	7,366	2,032	7,306	577	2,609	20,005
II. Communications and Buildings.	..	1,29,612	38,465	49,532	2,775	−24,224	1,96,160
III. Organization, etc. ..	..	2,019	..	9,507	..	.	12,426
Total ..	115	1,39,897	41,397	66,345	3,352	−21,615	2,29,491

The outstandings on account of revenue at the commencement and close of the year were :—

	On 1st April 1928.	On 31st March 1929.
	Rs.	R .
Northern Circle ..	1,28,470	1,08,224
Central Circle ..	10,535	306
Southern Circle ..	1,11,058	1,58,889
Sind Circle ..	1,53,914	1,59,818
Total ..	4,03,977	4,27,237

An irrecoverable amount of Rs. 994 was written off during the year in the Southern Circle under proper authority.

The outstandings on account of contractors and disbursers were as follows :—

	On 1st April 1928.	On 31st March 1929.
Northern Circle ..	18,176	15,529
Central Circle ..	7	510
Southern Circle ..	20,721	16,445
Sind Circle ..	2,464	2,221
General Direction ..	50,067	50,000
Total ..	91,435	84,705

CHAPTER VI.

RESEARCH AND EXPERIMENTS.

Research.

General.—The Research Branch in the Chief Conservator's office continued to direct the conduct of the research carried out in Divisions, the main objective being the satisfactory solution of important problems connected with silviculture. The results of the research work are co-ordinated in the Branch and the consolidated results made available for the benefit of all concerned.

Since inception of this work in 1926, seven subjects were completed in the previous years. Out of 19 subjects under investigation during the year five were completed and are now omitted from the list of current subjects and seven were added, leaving 21 subjects under investigation at the end of the year 1928-29. Nine subjects out of these are concerned with collection of figures of cost or of growth.

The five subjects completed during the year were :—

Serial No.	Subject	Divisions
14	Propagation of bamboos	Kolaba.
15	The relative value of different species for making charcoal.	Sukkur, Karachi, West Thana, Satara and Belgaum.
22	Comparative costs of and benefits derived from deep and shallow working of the soil prior to sowing and the comparative growth of seedlings obtained from seed sown under a deep and shallow cover of soil.	Panch Mahals.
23	Comparative results of stump planting when stumps are cut before and after removal to the plantation site.	Surat, East Thana, North Khandesh, Kolaba and E. D. Kanara.
24	Sowing teak on " rabs " in lines instead of in bunches to facilitate weeding and removal of excess seedlings for transplanting elsewhere.	West Nasik, East Thana, North Khandesh, Kolaba and E. D. Kanara.

The seven subjects added during the year were :—

Serial No.	Subject	Divisions
27	Reproduction of *anjan* (Hardwickia Binnata) by broadcast sowing and sowing in single plough drills in soil prepared according to different methods.	East Khandesh.
28	Effect of early burning on sandalwood growth and regeneration.	Belgaum (Khanapur Range).
29	Value of shrubs as nurses for artificially raised seedlings in scrub forests.	East Khandesh, West Khandesh and East Nasik.
30	Artificial propagation of Safed Musali (Medicinal).	North Khandesh (Shirpur East and Shirpur West Ranges).
31	To determine which of the following three methods tends to produce the maximum improvement in case of forked and branchy young transplants or seedlings :— (*i*) Cutting back the plants. (*ii*) Carefully pruning the undesirable shoot or shoots. (*iii*) Breaking the top bud of the undesirable shoot or shoots.	West Khandesh.
32	Determination of correlation between outer girth increment and heartwood increment of sandal.	Dharwar-Bijapur.
33	Determination of— (*i*) the periodic annual girth increment of *Simul* (Bombax malabaricum), (*ii*) the average annual girth increment of *Simul*.	Panch Mahals.

The work done and observations made during the year are described below:—

Subject No. 2.—Germination tests of teak seeds alternately soaked and dried (i) for a week, (ii) for a fortnight, the process being repeated three times in each case (Surat, Kolaba, Belgaum, West Khandesh, Panch Mahals and S. D. Kanara).

Owing to late issue of orders, the experiment was not repeated except in the Belgaum Division where the seed treated according to the above two methods was collected from two different areas. Seed alternately soaked and dried for a week gave 20 per cent. germination while seed alternately soaked and dried for a fortnight gave 90 per cent. germination. The experiment will be carried out during 1929-30 in all the above six Divisions, care being taken that the seed is collected *from one and the same area* and dibbled in plots close to each other.

Subject No. 4.—Effect of thinning on teak coppice at different ages (East Thana).

Original measurements were taken in sample plots 4A, 4B and 4C in September 1926. Thinnings were done in the early part of 1927. Seven additional sample plots were to be laid out in the coupe in which 4A has been laid out in successive years from 1927-1933. Two of these 7 additional sample plots were laid out and measurements and thinnings carried out in 1927-28 and 1928-29. It has however been found on inspection that coupe No. 1 in which sample plot 4A and two additional plots were laid out is unsuitable for the experiment. A fresh coupe containing plenty of coppice now of 8 years of age will be selected and sample plot 4A in the year 1929-30 and 7 additional plots one every year up to the year 1935 laid out therein. Remeasurements in sample plots 4B and 4C are due in September 1929.

Subject No. 5.—Effect of different degrees of thinning in teak plantations of different ages (West Nasik, West Thana, N. D., E. D., S. D., W. D., Kanara and Belgaum).

The next measurements are due in 1929-30 and are to be taken in the same months as the first measurements. The method of measuring and recording employed so far admits of comparison of only mean girths of each sub-plot before thinning at the first measurements and three years after thinning at the first re-measurements. Mean girths of whole sub-plots can hardly be accepted as a reliable basis for comparing the merits of different degrees of thinning. It is therefore proposed, while maintaining the present plots, to lay out a fresh series of plots in which measurements will be made and recorded in such a way as to admit of comparison of increments in girth and volume, and arrival at the comparative merits of different degrees of thinning. Underplanting in the most heavily thinned plots, except with Xylia xylocarpa, in the Southern Circle, has proved a failure and it is clear that—

(*i*) it is far cheaper and more practical to introduce mixtures at the time of creation of the plantation than at any subsequent period and

(*ii*) that nature can generally be depended upon to produce, in the form of seedlings, root suckers, coppice and bamboos, sufficient growth to mix with the teak plants ; it is only necessary to see that nature is not unduly interfered with. Underplanting has therefore been discontinued.

Subject No. 7.—Annual girth increment of sandal (Belgaum and Dharwar-Bijapur).

The first remeasurements were taken in the sample plots of the Belgaum Division in May 1928. The first remeasurements in the sample plots of the Dharwar-Bijapur Division will be done in November 1929, the original measurements having been done in November 1926. A few more remeasurements are necessary before reliable figures of girth increment of sandal can be secured.

Subject No. 8.—Increment of bubul under different degrees of thinning (Hyderabad Division).

No work has yet been done under this subject. A scheme has been finally drawn up for thinnings in plots of 7 ages, *viz.*, 3, 5, 7, 10, 15, 20 and 25 years, according to two degrees of thinning, *viz.*

(*i*) Heavy thinning. Lateral space between the crowns of about 1/5th the height of the crop.

(*ii*) Light thinning. Lateral space of about 1/10th the height of the crop.

Subject No. 9.—Propagation of lac on ber (Zizyphus jujuba) (Karachi Division).

Group A.—Contains 10 trees varying in girth from 8″ to 17″ and in height from 16′-4″ to about 28′ with small crowns. The trees of this group were lopped in March 1926 and inoculated twice in July and November 1927. The July incoulation failed while November inoculation was fairly successful. The trees of this group were again inoculated in July 1928 with sticks which varied from 80 to 440 on a tree with an average of 256 per tree. The thin encrustation that resulted from this inoculation was eaten by ants and squirrels with the result that removal on 11th September 1928 yielded only 22½ tolas of phunki lac. Two trees yielded as little as 1 and 1¼ tolas respectively. The July inoculation having failed, the trees were again inoculated in November 1928 with sticks varying from 165 to 645 per tree with an average number of 287 sticks per tree. The result was good and phunki lac removed on 18th December 1928 weighed 214 tolas.

Group B.—Contains 10 trees. Girth varies from 8″ to 24″. Height varies from 11′-4″ to 24′. The trees have small crowns. The trees were lopped in July 1927. They could not be inoculated in 1927 because the shoots were not succulent enough. The trees were inoculated in July 1928 with sticks varying from 100 to 340 on a tree with an average of 202 per tree. The ensuing encrustation was thin and was mostly destroyed by ants and squirrels. Phunki lac removed in September

1928 weighed 22 tolas. The July inoculation having failed, the trees were re-inoculated in November 1928 with sticks varying from 105 to 495 on a tree with an average of 242 sticks per tree. The inoculation was successful and the phunki lac removed on 8th December 1928 weighed 172½ tolas or 17·25 tolas per tree.

Note.—This group was originally group B and was subsequently numbered C. The trees of original group A subsequently numbered group B having died, this group is re-numbered B.

The experiment is to be continued. So far it appears that July inoculation fails and November inoculation is fairly successful. It also appears from last year's report that shoots take more than a year after pruning for the first time to be ripe for inoculation.

Subject No. 10.—Economic age for cutting bahan (Populus euphratica coppice (Shikarpur Division).

Results up-to-date are summarised below :—

Name of the sample plot	Area in acres	Cut during the year	Age at the time of cutting	Outturn in poles	Price obtained	Money value per acre per annum
					Rs. a. p.	Rs. a. p.
10A	½	1926-27 ..	4 years.	712	53 5 0	26 10 0
10B	½	1927-28 ..	5 ,,	624	55 14 0	22 6 0
10C	½	1928-29 ..	6 ,,	648	79 2 0	26 6 0
10D	½	to be cut during the year		1929-30 at the age of 7.		

The chief point brought out by the above statement is that in Sind, *bahan* should be cut while quite young. Generally speaking *bahan* or any other species should be felled at an age when it yields the largest, quantity of material of the dimensions most in demand. Four rotations differing by only one year can however, hardly have much effect on yield, dimensions or prices. More useful results would have been obtained by comparing result of felling at the ages 4 years, 7 years and 10 years. To this end the Divisional Forest Officer has been instructed to lay out two half-acre plots 10-D and 10-E in the same coupe in which plots 10-A, 10-B and 10-C have been laid out. Each of the two plots 10-D and 10-E should contain nearly the same number of saplings, *i.e.*, about 650. Plot 10-D is to be felled when the growth therein is exactly 7 years old and plot 10-E when the growth is 10 years old.

Subject No. 12.—Artificial propagation of Rosha grass (North and West Khandesh).

Definite conclusions arrived at last year were—

(1) that strip ploughing is the most economical method of working the soil for rosha.

(2) that ill-drained and water-logged localities should be avoided.

(3) that the effect of burning prior to introduction of seed is negligible.

Observations on the following three points were indecisive :—

(1) the effect of burning and grazing in plots where rosha grass has been established.

(2) the relative advantages of (*i*) sowing, (*ii*) planting as means of propagation.

(3) effect of different soils on germination and growth.

Further definite conclusions drawn are (*i*) that neither burning nor grazing are particularly harmful to established rosha crops, (*ii*) that equally good germination and growth are obtainable from both burnt and unburnt area.

On the questions of sowing versus planting and murum versus black-cotton soil the results obtained in North and West Khandesh Divisions are unfortunately contradictory and it seems there must be differences in method which require to be reconciled in order to reach a final decision. The experiment has therefore been ordered to be repeated on exactly the same lines in both North and West Khandesh Divisions.

Subject No. 13.—Propagation of hirda (Terminalia chebula) (Satara and Poona Divisions).

The information supplied by the Divisional Forest Officers concerned is too vague to permit of any conclusions being arrived at. The following however may be taken as established facts for the present :—

(*a*) Seed of hirda seems to be very much relished by squirrels, peafowl and crabs. It is therefore unlikely that direct sowings can be successful under forest conditions where the seed cannot be protected against squirrels, etc.

(*b*) In Poona nursery seedlings require to be protected against land crabs which eat off their cotyledons. This apprently can be secured by filling the crab holes with a mixture of liquid cow-dung.

(*c*) In Poona Division the seedlings want protection against hot western winds and should be raised on the northern and eastern sides of bushes.

The experiment will be repeated.

Subject No. 14.—Propagation of bamboos (Dendrocalamus strictus) (Kolaba Division).

Shoot-planting has proved to be the best method of propagating bamboos. Transplanting of one year seedlings also yields satisfactory results ; but it is and will always be difficult to secure sufficient annual supply of seed for large scale work. The experiment has been discontinued.

Subject No. 15.—Relative value of different species for Charcoal making (Sukkur, Karachi, West Thana, Satara and Belgaum).

The reports received show that for 100 maunds of fuel the yield of charcoal in maunds of 80 lbs. each from different species is as follows :—

**Dhaman. karambel, babul* and *kandi.*—25 maunds and over.

Dindal, shemat and *asana.*—Over 20 to 25 maunds.

Matti, kalamb and *jambul.*—Over 15 to 20 maunds.

The above are not absolutely reliable figures because they are based on single experiments except for the case of *babul* and *kandi*. They can however be taken as *fairly* accurate indicative figures.

As for determination of ratio between the volume of unplastered kiln and weight of charcoal, to facilitate calculation of royalty on charcoal on the basis of kiln measurements, in Nasik *babul* which was tried in 3 different localities in Nanedh Division gives fairly uniform results as follows :

100 c.ft. (stacked) of fuel weigh 100 maunds and when stacked in kiln for burning the unplastered kiln measures 1,125 c.ft. The yield of charcoal from 1,000 c.ft. (stacked) of fuel is about 100 maunds.

It is however doubtful if the above figures can be applied to *the whole of Karachi Division* with a fair degree of accuracy.

Kandi which was also tried in 3 localities in Sukkur gives divergent results.

The subject has been discontinued.

If it is necessary to determine the relation between the four factors, *viz.*, (*i*) volume of fuel in c.ft. (stacked), (*ii*) weight of fuel in maunds, (*iii*) volume of unplastered kiln in c.ft. and (*iv*) weight of charcoal in maunds, for any species for any locality, the Divisional Forest Officers can conduct sufficient (about half a dozen) experiments with the required species in the desired locality to collect the requisite average figures being arrived at, communicating the results to the C.F.P. Conservator.

**Note.* *Dhaman* (West Thana Division) *Grewia tiliaefolia.*
Kasambal (West Thana Division) *Dillenia pentagyna.*
Babul (Karachi Division) *Acacia arabica.*
Kandi (Sukkur Division) *Prosopis spicigera.*
Dindal (Belgaum Division) *Acacia latifolia.*
Shamat (West Thana Division) *Oxfordia nodiflora.*
Asana (West Thana Division) *Bridelia retusa.*
Matti (Satara Division) *Terminalia bomerensis.*
Kalamb (West Thana Division) *Nauclea parviflora.*
Jambul (Satara Division) *Eugenia jambolana.*

Subject No. 16.—Effect of Improvement fellings on diameter growth (Surat Division—Dangs).

There is nothing to report. When the next measurements to be done in 1929-31 are available it may be possible to arrive at tentative conclusions.

Subject No. 19.—Coppicing of Anjan (Hardwickia binata) (East Nasik, East Khandesh and West Khandesh).

The fresh plots ordered last year are in process of being laid out and felled, in East and West Khandesh Divisions. Final reports from these two Divisions are due in June 1930 when definite conclusions are expected to be arrived at.

Subject No. 21. Propagation of solid bamboos (Dendrocalamus Strictus) (Surat, East Thana and Kolaba).

Work so far done under this experiment shows that planting of 3' cuttings gives good results. [illegible] propagation by sowing or transplanting may be feasible [illegible] quantity is very difficult to secure. The experiment will be continued in the 3 Divisions.

Subject No. [illegible] comparative costs of and benefits derivable from deep [illegible] of the soil prior to sowing and the comparative [illegible] obtained from seed sown under a deep and shallow [illegible] (Panch Mahals).

The experiment was originally ordered in 7 Divisions. But on [illegible] it was discontinued in all the Divisions except in Panch Mahals (where pits had already been dug), as digging of pits 12" × 12" × 12" would in any case be too expensive.

The experiment conducted in Panch Mahals shows that soil cover over seed should not exceed $\frac{1}{2}$" and that digging pits 12" × 12" × 12" is too expensive for sowing to be resorted to in such pits on the scale of ordinary regeneration operations. The experiment has been discontinued.

Subject No. 23. Comparative results of stump-planting when stumps are cut before and after removal to the plantation site (Surat, East Thana, North Khandesh, Kolaba and E. D., Kanara).

There is hardly any difference in the number of successful strikings as regards burnt and unburnt areas or between stumps cut before and after transport. The experiment has been discontinued.

Subject No. 24. Sowing teak on "rabs" in lines instead of in bunches to facilitate weeding and removal of excess seedlings for transplanting elsewhere (West Nasik, East Thana, North Khandesh, Kolaba and E. D., Kanara).

The general opinion of those in charge of this experiment in several Divisions is that line sowing is the most advantageous method in all respects. Line sowing on burnt rabs should be the rule. The experiment has been discontinued.

Subject No. 25. Regeneration of unburnt patches in regeneration areas with "injaili" species (North Thana, Kolaba and S. D., Kanara).

Dibbling of seed of injaili species in burnt rabs with teak seed and transplanting the injaili seedlings from the burnt rabs into the unburnt parts of the regeneration area has given fair results in Kolaba. Propagation of valuable injaili species in this manner should be a regular regeneration operation in all Divisions of the Presidency Proper in coupes where such species are absent or scarce.

The experiment is to be done in North Thana and repeated in Kolaba. The dates (and year) on which the original sowing is carried out in burnt rabs and transplanting 6′ × 6′ is done in unburnt portions should be recorded. Also the progress of surviving plants should be observed and recorded.

In N. D., Kanara, owing to the very open nature of some of the Haliyal teak pole areas and the high percentage of teak, there is excessive desiccation and the soil is rapidly deteriorating. Experiments were therefore made to introduce other suitable species in such open places outside burnt patches, those tried being *honne* (Pterocarpus marsupium), blackwood and *shiwan* (Gmelina arborea). *shiwan* gave the best result and put on rapid growth, the best plants being about four feet in height at the end of the season. *Honne* and blackwood were fairly successful but the rate of growth was much too slow to enable them to compete with the dense growth of coarse grass. The experiment is being continued on a large scale this season and sowings have been made in ploughed drills.

The *Acacia intsia* creeper is a great nuisance in some of the high forest plantations of the Virnoli Range. Attempts were made to poison it to death with the use of "Atlas" tree killing solution but the result was not encouraging.

Subject No. 26.—Cost of simul (Bombax malabaricum) sowings and planting and percentage of survivals (East Thana, West Thana, North Thana and Panch Mahals).

Reports so far received show that *simul* can be successfully raised by dibblings on well burnt rabs in felled coupes in the same manner as teak, avoiding heavy soils and marshy ground, at a much lower cost than by using cuttings in special *simul* plantations. This method (*i.e.*, dibblings in burnt rabs in felled coupes) should therefore be adopted widely in felled areas situated within about twelve miles from Railway or Bunders in the Panch Mahals, in the Thana, Surat and Kolaba Divisions. The two species (teak and *simul*) are not to be sown on the same patch and care is to be taken to ensure that the area of the *simul* rabs, in any one coupe, does not exceed 25 per cent. of the area occupied by the teak rabs.

It also appears that the number of casualties is discouragingly high, the number of survivals varying from 7 per cent. in one area to about 50 per cent. in another. Drought, heavy and badly drained soils and rats, hares and monkeys in East Thana are the principal causes for this heavy mortality.

Selection of well drained medium soils should be the first consideration while raising *simul*.

Record of costs and survivals will be continued in the East and West Thana Divisions and kept in North Thana Division. Record of costs, etc., has been discontinued in respect of the failed *simul* plantation in Panch Mahals.

EXPERIMENTS CONDUCTED UNDER THE CONTROL OF THE DIVISIONAL FOREST OFFICERS.

Silviculture.

Satara Division.—Efforts were made with some success to propagate sandal by means of dibbling. In some cases dibblings were done outside the shelter of the bushes and in obviously unsuitable localities. Experiments have been continued on a large scale during this season (*i.e.*, 1929-30), dibblings being done only under the shelter of bushes and restricted only to suitable localities.

Belgaum Division.—A few charcoal kiln sites in the exploited coupes of the Gujnal Range were sown and planted with *babul* and *nim*. It is too early to say whether the experiment is likely to be a success. Sowing and planting of these species was done on a larger scale during the current year (*i.e.*, 1929-30).

Introduction of teak in the fuel coupes of the Khanapur Range.—The results up-to-date have been very promising. The experiment was continued on a large scale during the rains of the current year (*viz.*, 1929-30).

Dharwar-Bijapur Division.—Experiments in the artificial regeneration of blanks in Kod Range with *nim* seedlings of various ages are being tried. One year old plants are found to succumb to the drought during the following dry season. It is expected that older plants will be able to withstand drought more successfully. Experiments will therefore be continued with seedlings more than one year old.

Shikarpur Division.—The Divisional Forest Officer, Shikarpur, reports that he obtained sandal seed from the Divisional Forest Officer, Dharwar-Bijapur Division, and eucalyptus (*Eucalyptus Globulus*) seed from the Curator, Royal Botanic Garden, Calcutta, which was sown in the Rahuja garden but did not germinate. It will be tried again.

Statistics.

Six sample plots were laid out in the North and West Khandesh Divisions in the year 1928 with a view to determine the effect of improvement fellings and thinnings on increment. The data collected have been entered in registers according to the instructions contained in Howard's Code of collection and tabulation of statistical data.

Six sample plots (two laid out in 1927-28 and four in the year 1928-29) have been laid out in the *babul* area of the Poona Division to ascertain the effect of thinnings on the rate of girth increment in pure *babul* crops of different ages.

In N. D. Kanara, the sample plots laid out at Amga in 1920 to determine the effect of different degrees of thinnings were maintained. The plots have been well protected and the plants are putting on good growth. Next measurements are due in January 1930.

Experimental and Commercial activities.

The *Oxytenanthera monostigma* (*chiva* bamboo) supplied to the Forest Economist, Dehra Dun, for test regarding its suitability for lance staves was reported on as being to a certain extent promising for the purpose, but no very definite conclusion was arrived at.

Half-wroughts of *dhaman* (*Grewia tilliaefolia*), *dindal* (*Anogeissus latifolia*) and *tiwas* were supplied to the G. I. P. and B. B. & C. I. Railways for trial for ordinary hammer handles and were reported on to be unsuitable for the purpose.

Matti (*Terminalia tomentosa*) keys were supplied to the B. B. & C. I. and G. I. P. Railways for trial but it was found that with the low prices offered by the Railway, there was no business in it. A trial indent for teak keys for the M. & S. M. Railway is on hand and is likely to prove of value in disposing of scrap wood.

Stuart's patent sleeper clamps were received during the year from the M. & S. M. Railway for use on metre gauge teak sleepers. These clamps are useful in preventing splitting and if they are used on all sleepers as soon as they come out from the mill, there should be practically no rejections, provided the sleepers are not cut from obviously unsound and bad timber.

As most of the junglewood logs are susceptible to the attack of shot borers, if left lying in the forest or depôts for any length of time, observations were made to ascertain some practical method of keeping the attack under control and it was found that the most satisfactory method was to trim the logs free of all bark as soon after felling as possible.

Experiments with propagation of Lac.

Surat Division (*Mandvi Range*).—The crop from the winter inoculation of November 1927 was harvested on 22nd June 1928 when it yielded 2481 sticks. Out of these only 300 sticks were of fair quality while the rest were of very poor quality. As soon as the insects began to emerge all the sticks were tied to 58 *palas* (Butea frondosa) trees in coupe 17 Block VI, Luharvad, Peterkui Round on 6th July 1928 and after the completion of the emergence of the insects and their settlement on the branches all sticks were untied on 6th August 1928, these on scrabing, yielding 7 lbs. of crude lac. Observations from time to time from July onward up to October 1928 showed that there were no incrustations on the inoculated branches and the crop was a complete failure and there was no seed in stock to carry on the winter inoculation in November 1928 ; hence the Divisional Forest Officer, Bhandara, C. P., was requested to supply 2,000 brood lac sticks which he supplied on 21st November 1928 to the Range Forest Officer, Mandvi.

This time the experiment was carried on in two different localities and 1441 sticks were tied to 38 *palas* trees in coupe 18, Block VI, Peterkui Round, and 495 sticks to 23 *palas* trees in coupe 17, Block IV Lakhgaon Round, on 22nd November 1928 and 23rd November 1928, respectively.

The seed supplied was healthy and of good quality. On inspection of both the places a week after inoculation it was found that the insects had completely emerged and settled in large numbers on the branches and it was hoped that the harvest this time in July 1929 would not be disappointing. Unfortunately a severe frost in the last week of January 1929 completely dried not only the *palas* plants but the insects too. Hence the crop that was expected in July 1929 was an absolute failure and to carry on the experiment again for 1929-30 a fresh stock of seed will have to be obtained from Bhandara, C. P.

Dharwar-Bijapur Division.—Experiments on *Khair*, *wadiya* (Acacia senegal), *shigekai* (Acacia concinna), *ber* (Zizyphus jujuba), *hodjali* (Acacia latronum) and *tugli* (Alibizzia amara) in Badami Range were continued without decisive conclusions about the extent of the damage done by Eublemma amabilis, a predatory insect, and the preponderance of male lac insects in summer brood, being arrived at. Mr. Walker's suggestion for elimination of predatory insects, to the effect that all existing lac so infested should be removed, and suitable hosts in fresh plots, at a safe distance from the existing plots, inoculated with healthy seed lac, will be carried out during the current year.

Sind.—A special Ranger has been appointed to control and supervise all work in connection with lac in the Karachi and Hyderabad Divisions. A programme has been drawn up for the Ranger's guidance. There are very many factors chiefly of locality and climate involved in the successful propagation of lac. By making a careful record of these, it is hoped that the lac-bearing area will be increased.

CHAPTER VII.

ADMINISTRATION.

The office of Chief Conservator of Forests was held throughout the year by the writer of this report.

The territorial Circles were held by the following officers :—

Northern Circle	Mr. A. C. Hiley from 1st April 1928 to 21st February 1929.
	,, H. W. Starte from 22nd February to 31st March 1929.
Central Circle	,, C. E. L. Gilbert throughout the year.
Southern Circle	,, R. W. Inder from 1st April to 1st May 1928.
	,, D. B. Sothers from 2nd May to 20th November 1928.
	,, P. E. Aitchison from 21st November 1928 to 31st March 1929.
Sind Circle	,, P. E. Aitchison from 1st April to 7th May 1928.
	,, R. W. Inder from 8th May 1928 to 31st March 1929.

Forest Engineering Branch.—Mr. T. K. Mirchandani, Extra Assistant Conservator of Forests, attached to the Engineering Branch, held charge of the office of the Forest Engineer, S. D., from 1st April to 10th October 1928 when Mr. R. V. Alexander, Forest Engineer, returned from leave and held that charge till the close of the year.

Divisional charges were held by officers named below :—

Division	Name of Officer	From	To
Panch Mahals ..	Mr. K. E. Kotwal ..	Throughout the year.	
Surat	,, E. O. Sampson ..	Do.	
North Thana ..	,, W. C. de C. Walsh	Do.	
West Thana ..	,, R. K. Kanitkar	1st April 1928 ..	29th October 1928.
	,, H. W. Starte ..	30th October 1928.	19th February 1929.
	,, R. A. Shirali ..	20th February 1929.	31st March 1929.
East Thana ..	,, E. T. C. Vas ..	Throughout the year.	
West Nasik ..	,, E. A. Garland ..	1st April 1928 ..	12th April 1928.
	,, O. B. Parekh ..	13th April 1928 .	2nd May 1928.
	,, E. A. Garland ..	3rd May 1928 ..	31st March 1929.
East Nasik ..	,, R. A. Shirali ..	1st April 1928 ..	18th February 1929.
	,, R. K. Kanitkar ..	19th February 1929.	31st March 1929.
Working Plans, Northern Circle.	,, H. J. C. Millett ..	1st April 1928 ..	14th May 1928.
	,, R. A. Shirali ..	15th May 1928..	9th October 1928
	,, J. Petty ..	10th October 1928.	31st March 1929.
East Khandesh ..	,, J. L. Bell ..	Throughout the year	
North Khandesh ..	,, N. C. Ramchandani.	Do.	
West Khandesh ..	,, J. A. Singh ..	Do.	
Poona	Mr. G. S. Singh ..	1st April 1928 ..	19th May 1928.
	,, F. A. B. Coelho ..	20th May 1928..	9th June 1928.
	,, G. S. Singh ..	10th June 1928 .	31st March 1929.
Kolaba	Rao Saheb G. R. Patkar.	Throughout the year.	
Satara	Mr. K. V. Mankikar	1st April 1928 ..	4th December 1928.
	,, H. C. Holmes ..	5th December 1928.	31st March 1929.
Working Plans, C. C. ..	,, W. E. Pereira ..	Throughout the year.	
Kanara, N. D. ..	,, S. N. J. Ratnagar.	Do.	
Kanara, E. D. ..	,, J. Walker ..	1st April 1928 ..	15th August 1928.
	,, R. J. Smith ..	16th August 1928.	15th November 1928.
	,, J. Walker ..	16th November	31st March 1929.
Kanara, S. D. ..	,, Y. R. Divekar ..	Throughout the year.	
Kanara, W. D. ..	,, E. S. B. Tavener	1st April 1928 ..	18th May 1928.
	,, H. J. C. Millett ..	19th May 1928..	31st March 1929.
Kanara, C. D. ..	,, M. S. Tuggarse ..	1st April 1928 ..	9th November 1928.
	,, Y. R. Divekar ..	10th November 1928.	30th November 1928.
	,, M. S. Tuggarse ..	1st December 1928.	31st March 1929.

Division	Name of Officer	From	To
Belgaum	Mr. D. B. Sothers ..	1st April 1928 ..	30th April 1928.
	,, E. S. B. Tavener .	1st May 1928 ..	31st March 1929.
Dharwar-Bijapur ..	Rao Bahadur R. A. Hemmadi.	1st April 1928 ..	14th May 1928.
	Mr. V. R. Damle ..	15th May 1928..	17th May 1928.
	,, R. J. Smith ..	18th May 1928..	31st March 1929.
Working Plans, S. C. ..	,, V. R. Damle ..	1st April 1928 ..	6th November 1928.
	,, S. N. Kesarcodi..	7th November 1928.	31st March 1929.
Sukkur	,, A. F. Gonsalves .	Throughout the year.	
Shikarpur	,, P. J. Rodrigues..	Do.	
Larkana	,, M. L. Khanna ..	Do.	
	,, R. F. Sandeman .	1st April 1928 ..	28th August 1928.
Hyderabad ..	,, G. J. Ramchandani.	29th August 1928.	8th November. 1928.
	,, R. P. Dalley ..	9th November 1928.	31st March 1929.
	,, J. B. T. Brooks ..	1st April 1928 ..	4th April 1928.
	,, R. F. Sandeman .	5th April 1928..	28th August 1928.
Karachi . ..	,, R. W. Inder ..	29th August 1928.	11th November 1928.
	,, J. B. T. Brooks..	12th November 1928.	31st March 1929.

It may be seen from the details given above that changes among Divisional Forest Officers were frequent, chiefly owing to absence of officers on leave, as many as 14 out of the total number of 28 Divisions having changed hands during the year. Eleven Divisions were held wholly by Imperial Officers, 7 for part of the year by Imperial and for part of the year by Provincial Officers and 10 wholly by Provincial Officers.

At the close of the year the number of officers attached to Divisions as Assistants to Divisional Forest Officers or Sub-Divisional Forest Officers, all of the Provincial Service, was 11.

Mr. H. C. Holmes, originally of the Forest Engineering Branch, was, after training in England and on the Continent in the Imperial Forest Service Course, appointed to the regular Imperial Forest Service during the year.

During the year Rao Bahadur R. A. Hemmadi, Deputy Conservator of Forests and Rao Saheb P. S. Yennemadi, Extra Assistant Conservator of Forests, retired with effect from 15th May and 3rd July 1928. respectively, after long and meritorious service.

Subordinate and Clerical Establishments.—Eight new Rangers, trained at the Madras Forest College at Coimbatore, joined service during the year. Two new students were selected for the course of 1929-31 at that College during the year.

The Foresters' training class was held as usual in the Northern Circle under the supervision of Mr. D. A. Kundalkar, Ranger. Twenty-eight subordinates of the Northern and Central Circles were admitted to the class, of whom 3 were sent back as unfit and 1 on account of illness. Of the remaining 24 subordinates 22 passed the final examination. In the Southern Circle 12 young Foresters and Guards were placed for training under experienced Rangers. A set course of training was gone through. Of the 12 subordinates deputed during the year 9 came through the test successfully.

Casualties and Punishments.

Particulars	Northern Circle	Central Circle	Southern Circle	Sind Circle	Total	
					1928-29	1927-28
1. Retirements	12	9	12	6	39	45
2. Deaths	6	7	13	5	31	37
3. Resignations	16	11	3	10	40	42
4. Prosecutions	1	1	2	..	4	9
5. Degradations	11	6	10	6	33	34
6. Dismissals, removals, etc. ..	26	27	19	10	82	68
Total of 1928-29 ..	72	61	59	37	229	..
Total of 1927-28 ..	54	103	48	30	..	235

The health of the forest staff was on the whole fairly good. The staff of North Thana, Surat Dangs and Peint of the West Nasik Division suffered much as usual from malaria. A special medical officer was appointed in Peint from 1st October 1928 to 31st March 1929, and he did good work in attending to the staff and labour at the mills and fellings at Badgi and Haste.

The Department suffered a severe loss by the death during the year of Mr. A. S. Wagle, Superintending Foreman, Dandeli Mill in Kanara. He was one of the most valuable and devoted officers we have ever possessed.

The case against Mr. J. N. Dutt of the Provincial Forest Service, who was suspended last year, was decided by Government after the close of the year. He was reinstated in his former grade.

Mr. D. G. Thakkar, a Forester in West Thana Division, who was prosecuted for breach of trust and who had absconded, was arrested in June 1929, after the close of the year. The case is pending.

The clerk of the West Murbad Range Office in West Thana Division having misappropriated Government revenue amounting to Rs. 13 was dismissed from service.

There was a case of misappropriation by a Round Guard in the Satara Division of a sum of Rs. 66-12-0. The Guard was prosecuted and convicted. On appeal by the Guard, the conviction was upheld by the Sessions Court.

The case regarding the heavy defalcation committed by Mr. Dhopeshwarkar, Head clerk of the Kolaba Division, was decided by Government sanctioning the write-off of Rs. 3,813-12-0 and ordering recovery of the remaining sum of Rs. 1,271-4-0 from the Divisional Forest Officer. The prosecution lodged against the defaulting head-clerk is still pending, his whereabouts not having been traced.

Mr. D. M. Deshpande, a clerk in the Range office, Nandurbar, in West Khandesh Division, was prosecuted for having misappropriated a sum of Rs. 284, the price of 142 pass books. The clerk has absconded.

The work of the Rangers and other subordinate protective and office establishments is reported with a few exceptions to be satisfactory. The Conservator of Forests, Sind Circle, remarks with regret that, as a whole, the Ranger class in Sind does not display that single minded devotion to duty which distinguishes the Rangers in the Presidency Circles. The Ranger being the pivot of the executive, this is certainly regrettable and Mr. Inder hopes it will not be necessary to repeat this comment another year.

Civil Suits.

East Thana.—Three civil suits instituted by the Forest Department were decided during the year in favour of Government. The decretal amount with interest thereon aggregating Rs. 9,640-8-0 was recovered from the defendant in one of the cases and in the remaining 2 cases a total amount of Rs. 11,083-8-0 together with interest is in process of recovery.

East Khandesh.—Of the 29 civil suits filed by the timber merchants for refund of the amount of duty collected from them in respect to timber, 22 have been decided against Government. As a result, Government had to pay Rs. 11,226 on account of the duty, cost of suits and interest on the principal.

Kolaba Division.—A civil suit filed by the Tise Khot during the year against the Forest Department is pending decision in the Thana Court.

Kanara, Northern Division.—Of the 3 suits filed against Government two were dismissed and one was withdrawn.

Kanara, Southern Division.—Of the four suits pending at the close of the previous year, two were decided in favour of Government.

Out of 5 appeals (4 of last year and 1 of the year under report) two were disposed of (one filed by Government and the other against Government) both in favour of Government and the remaining 3 appeals are still pending.

Belgaum.—The three civil suits (one filed by Government and two against Government) referred to in the last year's report are still

pending in the Courts. During the year a suit was filed against Government by a purchaser for refund of price, ground rent and loading charges paid for two logs of wood purchased at Tavargatti in 1917. The case is pending.

The civil suit filed by a contractor in Sind last year was dismissed with costs during the year. The amount due to the department from the contractor was fully recovered.

Inspection and Tours.

The Chief Conservator toured in all the four Circles of the Presidency. Divisional and other offices were inspected by the Conservators as usual during the year. Irregularities and defalcations that were noticed have been recorded elsewhere.

His Excellency the Governor of Bombay camped at Yellapur in the Southern Circle in April 1928 and had a successful shoot in the neighbouring forests of Kanara, Northern and Eastern Divisions.

The Honourable Minister of Agriculture visited some of the forests in Karachi Division during the year.

The Inspector General of Forests to the Government of India paid a visit accompanied by the undersigned to some of the regenerated areas of the Khopoli Valley in the Kolaba Division.

Mr. Champion, the Forest Silviculturist, Dehra Dun, made a short tour in January and February 1929 in the three Circles of the Presidency proper, visiting teak plantations, sandalwood areas, and other important forests.

Land Revenue Administration.

The Divisional Forest Officer, Surat, continued to be *ex-officio* Assistant Political Agent, Dangs.

The Divisional Forest Officer, West Nasik, continued to be in charge of the land revenue administration of the Peint taluka and Vawar Mahal of the Thana District and also in charge of the Excise administration of Peint taluka.

The Divisional Forest Officer, North Thana, continued to be the Assistant Collector of the three Forest Mahals—Saiwan, Bapgaon and Sawa.

The revenue management by the Forest Department of the seven villages in East Khandesh was satisfactory during the year.

The Revenue and Excise administration of the Akrani Mahal continued to be in the hands of the Forest Department, with the Range Forest Officer as Mahalkari.

The Raisingpur Estate was as usual managed by the Forest Department under the Court of Wards, a Forester being in charge throughout the year.

The three Forest Mahals—Kulgi, Virholi and Dandeli in Kanara N. D., and two Mahals—Bilki and Kirwatti in Kanara E. D., continued to be under the administration of the Forest Department. In all the areas administered by the Forest Department the villagers were contented and their relations with the Department were satisfactory.

Kumries.—In the Kanara Western Division an area of 145 acres 20 gunthas, assigned in groups II and III of four villages, was voluntarily relinquished during the year.

In the Belgaum Division the majority of the more important villages in which kumri lands were allotted were visited by the Divisional Forest Officer. All villagers kumried the whole of their allotments excepting in the case of three villages in the Khanapur Range which could not work their allotments fully on account of sickness and other reasons.

Village Panchayats.—The seven villages in the Kanara Coast Division continued to manage their village forests under the Panchayat system. Of these five were inspected by the Divisional Forest Officer during the year. He reports that most of the Panchayats have appointed watchmen and proper care is being taken to preserve the existing trees, and that all Panchayats excepting Vannalli and Holangadda made a beginning at improving the forests by planting a few seedlings.

The relations between the Forest and other Government Departments continued to be cordial during the year.

CHAPTER VIII.

GENERAL REMARKS.

The financial results of the year compare favourably with those of the previous year, this being due in the main to improved conditions of the timber market during the year in the Northern and Southern Circles. Progress was made with works of development and improvement during the year as far as funds sanctioned by Government permitted. Liberal expenditure is still necessary for completing the various road schemes needed and already devised to open up the Dangs and Peint with a view to facilitate exploitation of fine timber-producing area, as yet unworked.

Thana Gurcharans.—The question regarding the administration of Gurcharans in Thana, and a scheme for their exploitation on a more scientific basis were pending at the close of the year. Government have since issued orders appointing Mr. F. X. Saldhana of the Bombay Forest Service as Gurcharan Officer, and laying down among other things that—

(*i*) The duties of the Gurcharan Officer should be mainly educative and to a certain extent preventive.

(*ii*) Apart from the maintenance of a suitable stock of injaili species for the satisfaction of local needs the teak in the Gurcharans will not be allowed to be exterminated in the present cycle of fellings, but will

be managed as a permanent source of revenue by the protection of the after-growth under the care of the Revenue Department, helped by the agency of the Forest Department.

(*iii*) Fellings, for commerical purposes, of teak and in some cases a proportion of injaili will be controlled and executed by the Forest Department and the receipts credited to that Department.

These arrangements should conduce to much more satisfactory management, for all concerned, of these valuable and extensive woodland areas, in future.

The demarcation of areas of revenue jungles in Rohri and Ghotki talukas in Sind mentioned in the last year's report has not yet been completed pending receipt of certain information called for from the Revenue Department and Land Record Office. The management of these areas after demarcation will be taken over by the Forest Department.

The question of transferring a part of Khairan-patti forests (Pole Series 18 to 22) of the West Thana Division to the Revenue Department for management has been under consideration. The Honourable Minister of Agriculture visited these forests during the year and has asked the Collector of Thana to inspect these areas again in detail and to submit definite proposals in the ensuing rains.

Forest cultivation.—Rs. 29,401 were realised as assessment for the forest areas given out for cultivation in the Northern Circle during the year under review. About 9,334 acres of forest land in the East Nasik Division were disforested during the year under Government Notification No. 5968-24 dated 19th April 1928 in favour of cultivation and transferred to the Revenue Department. In Sind remission of assessment for rabi cultivation amounting to Rs. 8,666 was granted owing to failure of crops on account of severe frost and lack of irrigation.

Forest settlements.—The general condition of these settlements in the two Khandesh Districts was good. An additional area of 940 acres of forest land was cleared of tree-growth in North Khandesh Division for extending the existing settlements. The crops were generally good as a result of which *tagai* advances amounting to Rs. 6,350 made during the year were almost all repaid. The only settlement which is reported to be unsatisfactory is at Petla in West Khandesh, the failure here being ascribed partly to the bad water supply and partly to the selection of unsuitable persons as settlers. These defects are being remedied. The settlers were as usual of great use to the Forest Department in forest operations.

Forest Advisory Committees.—Government have in their Resolution No. 985-28 dated 28th September 1928 sanctioned the formation of forest advisory committees in the following districts where forests play an important part, these bodies being composed of a limited number of Forest and Revenue Officers and of non-officials of suitable standing with the Collector as the Chairman. The idea is to promote informal discussion of questions concerning the local administration of the Forest

Department and for directing attention to and remedying any legitimate grievances or complaints of the public.

Name of District	Names of Forest Divisions included in the Districts
Thana.	North, East and West Thana Divisions.
Panch Mahals.	Panch Mahals Division.
Nasik.	East and West Nasik Divisions.
East Khandesh.	East Khandesh Division.
West Khandesh.	West and North Khandesh Divisions.
Kolaba.	Kolaba Division.
Kanara.	Kanara, N. D., E. D., S. D., and C. D.
Dharwar.	Dharwar-Bijapur Division.

No meetings were held in the Northern Circle during the year. Meetings of the Panch Mahals and Thana Districts Committees were held after the close of the year. In the Central Circle only the West Khandesh Committee met in conference before the close of the year. The proposals, all of which emanated from the non-official members, pertained mainly to grazing matters and permits. Out of 15 proposals brought forward, 9 were dropped or withdrawn, one was postponed, 4 were uanimously passed or carried by a majority and one was defeated. The proposals which were carried are given below with comments thereon :—

(*i*) The Grazing Rules should be given wide publicity.

Comments.—Vernacular translations of the rules have been widely distributed amongst the public concerned.

(*ii*) Grazing fees should be recovered through the Village Officers who should be paid one anna in a rupee on the amount collected.

Comments.—Experimental collection of grazing fees through Village Officers has already been introduced in one Round in each of Kolaba Poona and North Khandesh Divisions. If the system is found to work well and not to result in loss to Government, it will be extended.

As for the remuneration to be paid to the village officers, Government have already fixed 6 and 3 pies in the rupee for Shanbogh and Patel, respectively.

(*iii*) Separate passes should be issued for (*i*) browsers, (*ii*) plough cattle, and (*iii*) non-plough cattle.

Comments.—It is not clear what the proposal means and what benefit is supposed to be derivable therefrom.

(*iv*) The cattle may be allowed to go through forest area for drinking water.

The proposal was carried with the proviso that the people should fence both sides of the road.

Comment.—Thorns for fencing paths passing through closed forest are allowed by this Department to be taken free of charge, and permission to take cattle through closed forest along fenced paths for drinking water is freely given.

In the Southern Circle two meetings of the committee were held at Dharwar—one during the year and the other after the close of the year. It is reported by the Conservator that some work was done at the first meeting but very little could be done at the second as only one non-official member was present. The Collector has not sent the proceedings of these two meetings of the Dharwar District Committee to this office. The Collector has been requested to supply copies of the proceedings, in the absence of which no detailed comments on the work done at these meetings can be made. In Kanara District only one meeting was held after the close of the year in July 1929. The working and utility of these advisory committees will be more easily judged after another year's experience.

Alnavar-Dandeli Railway.—The earnings of this Railway during the year under report amounted to Rs. 47,817 with an expenditure of Rs. 39,097 as against the earnings of Rs. 53,570 and the expenditure of Rs. 49,992 in the previous year. The fall in both receipts and expenditure is due to reduced export of timber and manganese ore though the surplus is higher than that of the previous year. The management was more satisfactory than last year but the supply of open wagons was again not adequate in March and April. It is imperative that the Railway should make proper permanent arrangements for the supply of M.B.C. and P.T.L., the two open type wagons in large demand on this section.

The extension of the Gaikwad Baroda State Railway from Jharia to Waghai in the Dangs has been almost completed and the line, it is hoped, will be opened for traffic in November next. This extension is expected to have a favourable effect upon the prices of coupes as carting to Jharia and Kalaamba will cease. This will also shorten the lead, and depot and loading facilities will be very much improved.

The telephone lines in Northern Division, Kanara, continued to be very unsatisfactory so much so that no station gave efficient service for a sustained period of even two weeks in the year. This unsatisfactory state of affairs is attributed to inadequate control, inferior instruments and incapacity of the linesman in charge. The matter was brought to the notice of the Director of Telegraph Engineering in charge of the lines and some improvements were executed after the close of the year.

Famine Fodder operations were carried out in Thana and Panch Mahals Districts, the quantity of grass supplied during the year by the 9-year monopoly contractors being 64,69,490 lbs. The grass areas in the Panch Mahals were intentionally grazed over by ill-disposed persons following the Godhra riot and the contractors could not deliver the stipulated quantity of grass. The quantity of grass on hand at the three storage depots (Godhra, Dohad and Palghar) at the close of the year was 29,113,454 lbs.

Match Factories.—The Gujarat Islam Match Manufacturing Company, Ahmedabad, removed 304 cart-loads of match-woods from the Panch

Mahals forests for which a royalty of Rs. 114 at the rate of Rs. 0-6-0 per cart-load was recovered by this Department. This company enjoys the concession of removing match-woods at 6 annas per cart-load from Panch Mahals forests and at 4 annas per cart-load from the Dangs forests for a period of 10 years commencing from 1925-26. Their requirements appear to be very limited and the Panch Mahals forests can easily meet their limited demand as will be evident from the fact that since 1926-27 not a single cart-load of match-woods was removed by them from the area specially set apart for them in the South Dangs. As the match-woods in the latter area are much in demand by other purchasers, and, if sold to them, will yield extra revenue, the question, whether the concession granted to the company so far as it relates to the special area in the Dangs forests should be revoked or continued, has been referred for the consideration of Government.

The Indian Match-wood supply Trading Company of Gandevi removed 200 cart-loads of match-wood from the Central Dangs forests on payment of Rs. 300, and 300 cartloads from the North Dangs forests on payment of Rs. 675.

Match-wood trees were sold in Block VII of the Mandvi Range in Surat Division and Rs. 239-1-0 were realized as the price of 100 cart-loads.

In the North Thana Division match-wood coupes of main blocks 3 and 4, comprising an area of 7,937 acres 20 gunthas, were sold for Rs. 575.

The Match-wood coupe in the Bassein Range of West Thana Division was sold to the Thana Match Manufacturing Co. which removed 262 cart-loads of material and paid Rs. 704-2-0 at Rs. 2-11-0 per cart-load.

No offers were received for the match-wood coupes in East Thana Division.

A successful display of timber and minor forest produce was arranged by the Forest Department at the Swadeshi and Industrial Exhibition in Poona in September 1928. A similar display was also organized at the Jalgaon agricultural show in East Khandesh.

Revised grazing rules were sanctioned by Government in their Resolution No. 4217 dated 17th May 1928, but they were not brought into force during the year as the public had received insufficient notice. They have been given effect to from the current year, *i.e.*, 1929-30.

The area of 20 square miles allotted to browsers in forest proper under the control of the Forest Department in the Bijapur District was increased to 212 square miles under Government Resolution, Revenue Department, No. 1730/28 of 27th November 1928. This has resulted in the removal of the long standing grievance of the shepherds in that District.

The special exploitation operations in the Nagzari valley in Kanara Northern Division continued to be very efficiently managed by Mr. V. N. Hasabnis, Sub-Divisional Forest Officer, and 2,146 logs (59,118 Cft.)

and 560 sleeper pieces were delivered at the sale depot in Dandeli during the year. The gross value of timber thus delivered was approximately Rs. 2,00,000.

Three wild elephants were killed by special elephant shikaries during the year, two in Hutkhand village and the other in Sahasrawalli village, both of the Yellapur Taluka.

Strobilanthes callosus (karvi) seeded gregariously and died throughout the West Thana Division during the year.

The Chief Conservator was examined by the Simon Commission on the occasion of their visit to Poona in October 1928 on matters connected with the constitution of this Department, its future, and its working as a transferred subject since the Reforms.

CHAPTER IX.

The following is a summary of the progress made in the Forest Administration in the Bombay Presidency including Sind during the five years 1924-25 to 1928-29.

Organization.

A noteworthy event during the period under review was the revision of pay, passage and pension rules of the Superior Civil Services sanctioned by the Secretary of State for India in Council under Section 96B (2) (3) of the Government of India Act with effect from 1st April 1924 as a result of the recommendations of the Lee Commission ; *vide* Government of India Notification No. F-172-B-II-24 dated 15th January 1925.

Five posts borne on the cadre of the Imperial Forest Service of the Bombay Presidency were abolished during the period with the sanction of the Secretary of State and the cadre stands at 36, *vide* Government Resolution, Revenue Department, No. 21 A.D. dated 12th September 1928. The actual number of officers in the Imperial Service at the close of the period under review was 27.

The posts of the Superintending Engineer, Forest Department, and Forest Engineer, Northern Division, were abolished during the period. The engineering works of the Presidency are now being controlled by one Forest Engineer assisted by an Officer of the Provincial Forest Service. The work done by the Engineering Branch during the period under review has been recorded in the annual Administration Reports.

Provincial Forest Service.

There was no change in the sanctioned cadre of the service which stood at 27 at the close of the quinquennium.

Two advance permanent increments of pay were sanctioned by Government (*vide* G. R., R. D., No. 524 A.D. dated 1st April 1926) with effect from 1st April 1926 to nine Extra Assistant Conservators who held that appointment at the time of the revision of 1920 and derived no immediate benefit from it.

Subordinate Service.

The strength of the executive and protective Forest Service at the beginning and close of the quinquennium was as follows :—

	No. of Rangers on pay				No. of Foresters on pay			No. of guards on pay	
	Rs. 200	Rs. 175	Rs. 150	Rs. 80—5—125	Rs. 60	Rs. 50	Rs. 30—1—40	Rs. 25	Rs. 15—½—20
At beginning ..	11	16	24	116	22	113	335	449	2,458
	167				470			2,907	
At close ..	11	16	24	113	22	113	359	447	2,006
	164				494			2,453	

Owing to financial stringency reduction of three posts of Rangers and 454 posts of guards was made under orders issued by Government, from time to time. Twenty-four posts of Foresters in the last grade were added during the period, the extra cost on this account being met from the savings effected by the abolition of Guards' posts.

Under Government Resolution, Revenue Department, No. 3399/24 dated 25th July 1925 permanent travelling allowance at Rs. 10 per month was sanctioned to Forest Guards in Charge of Rounds.

Permanent travelling allowance of Forester Surveyors was also raised from Rs. 15 to Rs. 20 per month under Government Resolution, Revenue Department, No. 2572/24 dated 13th June 1925.

The territorial changes effected during the quinquennium were :—

Redistribution of the three Forest Divisions of Kanara, Central, Eastern and Southern Divisions into two Divisions and constitution of a new Coast Division Kanara for the minor forests were sanctioned by Government at the close of the last quinquennium and brought into force during the period under review. The formation of the new Coast Division was brought about mainly with the object of working the forests entirely for the satisfaction of the needs of the more densely populated coastal tract and for providing the coast villages and towns with a regular supply of cheap fuel. The new Division is, save for technical matters and accounts placed under the direct control of the Collector.

The revenue administration of the Saiwan, Bapgaon, Sawa and Vavar Mahals of the Thana District was entrusted to the Forest Department under Government Resolution, Revenue Department, No. 1442/24 dated 29th July 1927. The Divisional Forest Officer, North Thana, has been appointed *ex-officio* Assistant Collector for the first three Mahals, and the Divisional Forest Officer, West Nasik, for the fourth, the respective Range Forest Officers under them being appointed as *ex-officio* Mahalkaries.

Other minor changes entailing transfer of Ranges from one Division to another, readjustment of Rounds, etc., were also carried out wherever necessary under proper authority.

2. Changes in Area.

The forest area at the beginning and close of the quinquennium was as follows :—

	In charge of Forest Department		In charge of Revenue Department		Total Sq-miles.
	Reserved Sq. Miles	Protected Sq. Miles	Reserved Sq. Miles	Protected Sq. Miles	
At the beginning	11,969	516	1,829	656	14,970
At the close	11,755	564	1,955	631	14,905
Difference	−214	+48	+126	−25	−65

The net decrease in the total area of the Forest is chiefly due to disforestment of large areas in favour of cultivation, rectification of mistakes in the area shown in the Forest Register, and erosion in Sind. The changes in the area of the reserved forests in charge of the Forest and Revenue Department were mainly due to the territorial changes effected during the period whereby the whole area of the Kanara Coast Division has been placed under the control of the Revenue Department (Collector of Kanara).

3. Forest Settlements.

The area finally settled at the beginning of the period under report was 12,485 square miles under the Forest and 2,485 square miles under the Revenue Department, total 14,970 square miles, and at the close it was 12,319 square miles and 2,586 square miles, respectively, total 14,905 square miles. This is contributed by the different Circles as shown below :—

	In charge of the Forest Department Sq. miles	In charge of the Revenue Department Sq. miles
Northern Circle	3,320	484
Central Circle	3,842	1,488
Southern Circle	4,010	613
Sind Circle	1,147	1
	12,319	2,586

Out of the area given out for inforest cultivation in the Northern Circle, 6,429 acres from the Panch Mahals Division and 14,334 acres from the East Nasik Division were disforested and transferred to the Revenue Department.

The question regarding the afforestation of certain traverse numbers in Dohad and Jhalod talukas which was started in 1915 was finally settled with the result that 3,030 acres are in the process of being notified as reserved forest.

The question of acquiring certain malki numbers in the Mandvi Taluka is still pending.

The proposals submitted by Mr. E. W. Perry, I.C.S., regarding the better management of the Thana Gurcharans were sanctioned by Government in 1926. The appointment of a Gurcharan Officer has recently been notified by Government, *i.e.*, after close of the quinquennium under report.

The inclusion in reserved forests of certain rabi numbers in Peint Taluka sanctioned in Government Resolution, Revenue Department, No. 3842 of 1st June 1927 is pending final notification.

A proposal to convert suitable portions of the Khairanpatti forests of the West Thana Division into protected forest for the use of the villagers is under consideration. The portions to be so converted will be those which do not contain valuable timber and which are not required to be preserved for climatic reasons. The Collector of Thana is examining the whole area for this purpose and the question will be decided shortly.

4. Demarcation.

The total length of artificially marked boundaries in the Presidency at the commencement and close of the quinquennium was as shown below :—

	On 1st April 1924 (Linear miles)	On 1st April 1929 (Linear miles)
Northern Circle	8,432	8,502
Central Circle	13,377	13,426
Southern Circle	15,851	14,220
Sind Circle	2,111	2,112
Total ..	39,771	38,260

The net decrease in the total length is mainly due to the excess of disforestments over afforestments.

5. Surveys.

The rabi lands in Peint and Protected forests of Vavar and Vangni in the West Nasik Division were surveyed by No. 8 Party, Survey of India, on a scale of 4″=1 mile. Out of the total area of 97 square miles 84 square miles were completed at a cost of Rs. 24,416.

Three square miles of the area of Wadgaon Range and Paud Round in Poona Division were surveyed on the same abovementioned scale at a cost of Rs. 716.

A topographical survey of some of the forests in Kolaba Division and Sind was also made during the period under review.

6. Working Plans.

The work of preparation of new and revision of existing working plans progressed steadily and satisfactorily during the period under review.

In all 15 plans were sanctioned by Government during the period as shown below :—

	Original	Revision
Northern Circle	..	3
Central Circle	1	1
Southern Circle	6	4
Sind Circle	..	..
Total, Presidency ..	7	8

The areas under sanctioned working plans at the beginning and close of the quinquennium were :—

	At beginning Sq. miles	At close Sq. miles.
Northern Circle	2,777	3,019
Central Circle	2,320	2,499
Southern Circle	1,746	1,905
Sind Circle	1,029	926
Total ..	7,872	8,349

The total forest area of the Presidency in charge of the Forest Department at the close of the quinquennium was 12,552 square miles (including 233 square miles of Kanara Coast Division shown as in charge of the Revenue Department). The progress in the preparation of working plans is summarised as follows :—

(*a*) sanctioned plans exist for 8,349 square miles, *i.e.*, 67 per cent.—

(*i*) of these, revision is in progress for 580 square miles, and

(*ii*) revision is required for 1,130 square miles,

(*b*) new plans are in course of preparation for 373 square miles, and

(*c*) plans have still to be taken in hand for 600 square miles, and

(*d*) no plans are considered to be necessary at present for 3,230 square miles.

7. Communications and Buildings.

The expenditure on (1) communications, (2) buildings, (3) wells and other works for the Presidency amounted to Rs. 17,92,422 during the

period under review as against Rs. 23,42,094 during the previous 5 years, a decrease of Rs. 5,49,672. By sub-heads these amounts were :—

	New Works		Repairs		Total	
	1924-25 to 1928-29	1919-20 to 1923-24	1924-25 to 1928-29	1919-20 to 1923-24	1924-25 to 1928-29	1919-20 to 1923-24
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Communications ..	6,09,974	9,76,377	5,32,572	5,37,901	11,42,546	15,14,278
Buildings ..	3,57,761	5,43,030	1,89,904	1,86,170	5,47,665	7,29,200
Other Works ..	37,054	45,330	65,157	53,286	1,02,211	98,616
Total ..	10,04,789	15,64,737	7,87,633	7,77,357	17,92,422	23,42,094

Owing to financial stringency new works were carried out at a slower rate during the period under review than in the preceding five years. The major part of the expenditure on new works was incurred in the construction of roads in the Dangs (Surat Division) and Peint (West Nasik Division) where the exploitation of fine timber was and is still hampered by want of communications. Development in the Dangs has begun to bear fruit, as will be evident from the fact that the revenue of Surat Division has risen from Rs. 4,82,478 in 1923-24 to Rs. 6,00,435 in 1928-29 and is likely to rise still higher hereafter. Similarly construction of a few roads in Peint has resulted in a small increase in the revenue of the West Nasik Division from Rs. 1,36,703 in 1923-24 to Rs. 1,61,268 in 1928-29. At present only the most accessible areas in Peint are being exploited, but road projects are under consideration and execution, with a view to opening up the remainder of the valuable forests there. When the required roads are constructed the West Nasik Division, which is at present being worked at a loss, should yield an appreciable surplus and quickly repay any expenditure which may have been incurred. Road construction in Peint is therefore a great and urgent necessity and efforts will be made to push this work on as vigorously as possible.

For want of sufficient funds it was not possible to carry out building programmes to the extent required. More buildings to house the subordinates and touring officers are badly needed in places where the climate is unhealthy and private accommodation non-existent.

The Forest Engineering Branch has amply proved its utility in the works carried out by this Department for the development of the

forests. The work done by this Branch during the period under review consisted principally of surveys, estimating, investigation of new projects, mechanical transport, mechanical extraction of timber and saw mills.

Road and bridge work supervised or actually undertaken by the Engineering Branch was concentrated mostly in the Northern and Southern Circles. The work consisted of surveys and alignment of new roads lying in difficult places, remodelling, improvements and drainage of existing roads. Standard cross sections of three classes of forest roads were prepared. Earth work tables for these have also been drawn up. Three types of construction in respect of buildings comprising about 100 sets of plans and estimates were completed and have since been sent to Mr. Pipe, late Superintending Forest Engineer, for scrutiny before final printing. The publication of standard plans and estimates will greatly reduce and facilitate the work of the Forest Officers in designing, calculating and estimating.

Mechanical Transport.

The Department made use of two outfits, the Foden Steam Tractor and the Sentinel Steam Tractor with their trailers, mainly for transport of sleepers and logs in N. D. Kanara. Ultimately experience showed that the upkeep of these tractors on log haulage was a costly business in that the running cost of such transport was found to be much higher than prevailing cart rates. Mechanical breakdowns were also frequent for want of good metalled roads, competent drivers and mechanics were not available for work in remote jungles, and the plants were from one cause or another subjected to long periods of idleness. On all these grounds the work of these tractors was discontinued. The Foden Tractor is now doing good work as a Portable Saw Mill and the Sentinel Tractor is being disposed of by sale.

Mechanical Extraction of Timber.

Two Fordson outfits (one outfit was purchased in 1926-27 only) and one Buffalo Winch worked in the Nagzhari Valley. Another Buffalo Winch has been working on the Kaneri River slopes of Gund Range in W. D. Kanara since 1926-27. The extraction costs are cheaper than those charged by contractors in very much easier localities and Government is now securing a large and increasing revenue annually amounting to more than 2 lakhs of rupees from these forests which yielded nothing formerly.

Long hauling (from valley bottoms and slopes to roadways) was first experimentally done in 1926-27 when 32 logs were extracted by means of one Tractor at a cost of Rs. 53-6-0 per ton, mean length of haul being 2,700'. 77 logs were next extracted with two tractors (the haul being divided between the two) with the result that the cost was reduced to Rs. 36 per ton. Long hauling by relay in this manner was continued in 1927-28 and 1928-29.

The following statement compares the outturn, the mean length of haul, and the cost for the years 1926-27, 1927-28 and 1928-29.

	Outturn (tons)			Mean length in feet			Cost per ton		
	1926-27	1927-28	1928-29	1926-27	1927-28	1928-1929	1926-1927	1927-1928	1928-1929
							Rs. a. p.	Rs. a. p.	Rs. a. p.
Fordson Outfit— Ordinary ..	752·78	1,071	809·41	820	639	1,566	11 10 6	8 14 0	16 0 7
Long ..	..	188		..	1,950		..	21 12 0	
Animal Winch at Nagzhari.	424	371	409·36	742	708	914	11 4 6	10 8 9	11 12 7
Animal Winch at Gund.	176	354	236·14	484	908	868	15 5 0	12 2 3	13 0 6

The general conditions of working increase in difficulty as work advances down the Nagzhari towards the main Kalinadi Valley and corresponding general increase in cost is therefore to be anticipated. Fortunately the margin of profit is very large on the valuable teak extracted.

Saw Mills.

Seven saw mills worked during the period under review, at Karanjara and Chikhalda in the Dangs, at Badgi and Haste in Peint and at Dandeli, Bomanhalli and Kirwatti in Kanara. Two mills were closed about the end of the quinquennium, one at Bomanhalli in N. D. Kanara and the other at Karanjara in Surat Division, for want of work. The Chikhalda mill is being shifted to a new site in the Khapri Valley. The Forest Engineering Branch continued to attend to technical matters connected with the maintenance and running of the mills. The condition of machinery, equipment and mill stores has been much improved. All stores have been standardised and a systematic account of stores introduced and maintained. A small workshop is established at Dandeli where all petty repair work is carried out. As a result of efficient working and management, the output of sawn material from the mills increased from 3,12,000 c.ft. in 1924-25 to 334,753 c.ft. in 1928-29 and what is more important, the average sawing cost per c.ft. was reduced from 7·7 annas in 1924-25 to 5·42 annas in 1928-29. Handsome profits have been earned. Taken together the mills showed, as commerical concerns, a profit of Rs. 3,05,500 in the year 1928-29 against Rs. 1,62,057 in the year 1924-25.

Engineering Establishment.

The strength of the Forest Engineering Establishment was reduced by about 50 per cent. during the quinquennium and the staff, which is now kept at the barest minimum, consists of an Engineer, an officer of the Provincial Forest Service and a few select and specially trained temporary men. A small engineering establishment will be required for many years to come for such works as the following :—

(*a*) Survey and aligning of roads, preparation of their estimates and construction of the more important roads and bridges.

(*b*) Skidding or mechanical extraction of timber.

(*c*) Upkeep of saw mills, machinery and stores.

Proposals are under the consideration of Government for providing certain temporary subordinates of this establishment with permanent appointments.

8. Forest Offences.

The average annual number of forest offences reported during the period under review compares with that in the preceding five years as follows :—

	Northern Circle		Central Circle		Southern Circle		Sind Circle		Total		
	Quinquennium		Quinquennium		Quinquennium		Quinquennium		Quinquennium		Difference
	Present	Previous	Present	Previous	Present	Previous	Present	Previous	Present	Previous	
Injury to forest by fire.	619	532	563	573	566	839	165	157	1,913	2,101	−188
Unauthorised fellings	2,899	2,200	3,443	2,747	1,409	1,450	1,375	1,388	9,126	7,785	+1,341
Unauthorised grazing	2,054	2,129	2,171	2,266	860	1,057	1,480	1,300	6,565	6,752	−187
Miscellaneous	403	283	1,104	883	236	158	90	42	1,833	1,366	+467
Total	5,975	5,144	7,281	6,469	3,071	3,504	3,110	2,887	19,437	18,004	+1,433

On the whole there was an increase of 1,433 cases which is shared by all Circles except the Southern Circle. It occurs mainly under "Felling" and "Miscellaneous" in the Northern Circle and Central Circle. The increase under the former head was chiefly due to heavy illicit cuttings conducted on an organised scale in West Nasik, North and West Thana and West Khandesh Divisions and the increase under the latter head was due partly to encroachments from inforest cultivators and partly to enforcement of transit rules.

Systematic looting of sandalwood that had been going on in the Belgaum Division for a number of years with the connivance of certain subordinates was detected and put a stop to during the period under review. It was also found that irregular movement of sandalwood was facilitated by the indiscriminate issue of passes by Indian State Officials and Inamdars and by the non-observance of transit rules by the Railway Officials. Several prosecutions were undertaken as a result of these disclosures, which ended in the conviction of the accused and the confiscation of the property to Government. The Forest subordinates connected with these cases were duly punished, some with dismissal and some by withholding promotion. These measures have resulted in the stoppage of such thefts.

9. Fire Protection.

The average area under systematic fire protection and the average of failures during the two quinquennial periods are compared below :—

Circle	Average area in square miles					
	1924-25 to 1928-29			1919-20 to 1923-24		
	Attempted to be protected	Failures	Percentage of success	Attempted to be protected	Failures	Percentage of success
Northern	3,339	97	97·6	3,275	98	97·0
Central	2,908	149	94·9	2,680	209	92·2
Southern	1,768	103	94·2	4,227	293	93·1
Sind	489	9	98·8	624	5	99·4
Total ..	8,504	355	95·8	10,806	605	94·4

The decrease in the area attempted to be protected from fire occurs in the Southern and Sind Circles. It is mainly due to the fact that in the former Circle such areas only as were specially protected have been dealt with in the present quinquennium whereas those of the previous quinquennium represent the average of the whole area even though part of it was not subjected to any special protective measures.

10. Protection from Cattle.

The average areas annually open and closed to grazing during the two periods were as follows :—

	Area in square miles					
	Open to all animals	Percentage	Open to all animals except browsers	Percentage	Closed to all animals	Percentage
Present quinquennium ..	3,626	24·2	9,075	60·7	2,262	15·1
Previous quinquennium ..	3,284	22·0	8,953	59·8	2,728	18·2
Difference	+342	..	+122	..	−466	..

The increases in the area under " open to all animals " and under " open to all animals except browsers " are due to additional facilities having been granted to villagers by opening to grazing all forest except valuable fodder reserves and areas under regeneration and also to the throwing open of more forest area for sheep and goat grazing in the Bijapur District of the Southern Circle.

The average number of all animals admitted to graze in the forest increased from 2,356,009 in the previous quinquennium to 2,458,285 in the period under report. By Circles these figures were :—

	1924-1929	1919-1924
Northern Circle	774,688	777,487
Central Circle	1,105,718	932,650
Southern Circle	477,692	526,943
Sind Circle	100,187	118,929
Total ..	2,458,285	2,356,009

The increase in the Central Circle is due to large influx of cattle in famine times from neighbouring states into the Khandesh Divisions. The decreases in the other Circles are mainly due to the fact that no special extension of grazing facilities was required in the Southern Circle, as was the case in the previous quinquennium owing to fodder scarcity in 1920-21 and that free grazing was not required by hill people in the Sind Circle to the same extent as formerly.

11. Yield and Outturn.

The average annual outturn of the forest for the two periods was as follows :—

(*i*) *By Government agency and purchasers.*

Circle	Timber and fuel cubic feet in thousands		Bamboos value		Sandalwood value		Minor Produce value	
	Average 1924-29	Average 1919-24	Average 1924-29	Average 1919-24	Average 1924-29	Average 1919-24	Average 1924-29	Average 1919-24
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Northern ..	8,989	7,542	56,681	43,208	127	213	1,93,381	1,63,978
Central ..	6,509	4,775	11,756	11,641	3,584	1,618	6,41,059	4,44,719
Southern ..	10,518	11,205	77,181	62,300	1,24,004	64,656	1,51,135	1,20,098
Sind ..	19,369	18,614	..	..	..	..	84,086	80,896
Total ..	45,385	42,136	1,45,618	1,17,158	1,27,715	66,487	10,69,661	8,09,691

The decrease under " Timber and fuel " in the Southern Circle is due to the discontinuance of the extraction of firewood in Belgaum and Kanara W. D. for the Madras and Southern Mahratta Railway who for several years now have been using coal in place of wood fuel. The increases in other Circles are mainly due to the introduction of revised Working Plans, to new Departmental fellings being started to supply the saw mills, and to more exploitation of deadwood and thinning areas.

The increase under " Bamboos " is partly due to the demand created by the Gujerath floods in 1927 and partly to the revision of export rates in the Southern Circle.

The rise under "Sandalwood" is due to a larger quantity being exploited under new Working Plans, and better prices realised therefor, and that under "Minor produce" is due to better realizations for some of the products, to the grass storage scheme sanctioned in 1921 as an insurance against fodder scarcity in the Panch Mahals and North Thana Divisions, and also to the recovery of royalty on Manganese in the Southern circle.

(ii) Free Grantees

Circle	Timber and fuel cubic feet in thousands		Bamboos value		Minor produce value	
	Average 1924-29	Average 1919-24	Average 1924-29	Average 1919-24	Average 1924-29	Average 1919-24
			Rs.	Rs.	Rs.	Rs.
Northern	30	13	131	100	303	638
Central	19	22	536	330	2,885	629
Southern	60	84	297	614	26,889	25,260
Sind	60	11	..	..	6,940	6,944
Total ..	169	130	964	1,044	37,017	33,471

The variations need no explanation as the grants vary according to necessities of the general public.

(iii) By Concessionists.

Circle	Timber and fuel cubic feet in thousands		Bamboos value		Minor produce value	
	Average 1924-29	Average 1919-24	Average 1924-29	Average 1919-24	Average 1924-29	Average 1919-24
			Rs.	Rs.	Rs.	Rs.
Northern	5,229	6,158	6,337	12,385	2,98,908	2,97,349
Central	1,119	622	343	10	59,545	24,740
Southern	3,300	2,775	45,000	18,260	3,04,339	4,08,358
Sind	11	41	..	..	4,159	2,618
Total ..	9,659	9,536	51,680	30,655	6,66,951	7,33,065

These are estimates based on general requirements of the people who are allowed privileges under settlements prescribed for different districts.

12. Financial Results.

The average annual financial results for the two quinquennial periods compare as follows :—

Circle	Revenue		Expenditure		Surplus		Difference
	1924-29	1919-24	1924-29	1919-24	1924-29	1919-24	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Northern ..	25,59,257	24,76,462	11,76,097	10,48,176	13,83,160	14,28,286	−45,126
Central ..	12,94,382	11,17,115	7,10,456	7,09,400	5,83,926	4,07,715	+1,76,211
Southern ..	28,73,852	26,81,230	17,20,819	20,73,584	11,53,033	6,07,646	+5,45,387
Sind ..	7,12,812	6,95,415	3,95,230	3,53,361	3,17,582	3,42,054	−24,472
General Direction, Utilization Circle, Bombay Forest College and Forest Engineering Branch.	4,263	1,517	2,56,077	1,74,102	2,51,814	1,72,585	−79,229
Total ..	74,44,566	69,71,739	42,58,679	43,58,623	31,85,887	26,13,116	+5,72,771

The average gross revenue shows an increase of 6·8 per cent. while the average expenditure shows a decrease of 2·3 per cent. The percentage of the average surplus on the average gross revenue works out at 42·8.

The increase in revenue is due to the initiation of a more liberal policy of road construction in the Northern Circle, to the extraction by mechanical means of timber from the Nagzhari Valley and to the increased efficiency of and consequent improvement in receipts from the Government saw mills in the Southern Circle, to extended exploitation of sandal, to the realization of rent from grass kurans, most of which were formerly leased to the Military Department free of charge in the Central Circle, and also to a slight improvement in the prices realised for timber and other produce.

The decrease in expenditure, which occurs only in the Southern Circle and which has been counterbalanced to some extent by small increases in the other Circles, is due chiefly to large reduction of Engineering establishment, general economy, and stoppage of all unprofitable extraction operations and of the departmental supply of fuel to the Madras and Southern Mahratta Railway.

The average surplus shows a very satisfactory increase of nearly 5¾ lakhs of rupees over the corresponding figure of the previous quinquennium.

13. Forest Education.

Candidates for Rangerships were, as usual, sent up for training at the Madras Forest College at Coimbatore. In all 21 candidates went through the course, of whom 20 obtained higher standard certificates and 1, lower standard. The Vernacular Forest Class started in 1922 in the Northern Circle for training Foresters and Round Guards from the

Northern and Central Circles was continued during the period under review. In the Southern Circle no regular class was held, but literate subordinates were trained in a set course under selected and experienced Rangers. The arboriculture Class in Hyderabad, Sind, referred to in the last report was closed from 1925-26 for want of a sufficient number of students.

14. Research and Experiments.

Research.

A Research Branch was started in 1925-26 under the control of the Chief Conservator and considerable progress has been made during the period under review. The researches carried out cover a wide field and deal with the regeneration of teak, jungle-wood species and bamboos, propagation of minor produce and collection of figures of cost and growth. The several subjects on which research was started, the work done and the results observed up to date have been described in detail in Chapter VI of this and previous Reports. In all, 33 subjects have come under investigation, of which 12 subjects were completed up to the end of the year 1928-29 and observations are in progress in the case of remaining 21 subjects.

15. Administration and Control.

The office of the Chief Conservator of Forests was held by the following officers :—

Mr. W. E. Copleston, C.S.I., from 1st April to 10th October 1924.

Mr. A. G. Edie, C.I.E., from 11th October 1924 to 22nd April 1927.

Mr. E. M. Hodgson, from 23rd April 1927 to 11th February 1928.

Mr. H. L. Newman, from 12th February 1928 to 31st March 1929.

The several Conservatorships were held as follows:—

Northern Circle.

Mr. G. E. Marjoribanks	from	1st April 1924 to 26th March 1925.
„ G. S. Butterworth	„	27th March 1925 to 23rd October 1925.
„ G. E. Marjoribanks	„	24th October 1925 to 18th July 1927.
„ G. S. Butterworth	„	19th July 1927 to 29th July 1927.
„ R. W. Inder	„	30th July 1927 to 18th November 1927.
„ A. C. Hiley	„	19th November 1927 to 21st February 1929.
„ H. W. Starte	„	22nd February 1929 to 31st March 1929.

Central Circle.

Mr. E. M. Hodgson	from	1st April 1924 to 1st March 1925.
,, C. E. L. Gilbert	,,	2nd March 1925 to 1st October 1925.
,, E. M. Hodgson	,,	2nd October 1925 to 23rd April 1927.
,, C. E. L. Gilbert	,,	24th April 1927 to 31st March 1929.

Southern Circle.

Mr. H. L. Newman	from	1st April 1924 to 10th March 1927.
,, G. S. Butterworth	,,	11th March 1927 to 16th July 1927.
,, A. C. Hiley	,,	17th July 1927 to 13th November 1927.
,, H. L. Newman	,,	14th November 1927 to 9th February 1928.
,, R. W. Inder	,,	10th February 1928 to 1st May 1928.
,, D. B. Sothers	,,	2nd May 1928 to 20th November 1928.
,, P. E. Aitchison	,,	21st November 1928 to 31st March 1929.

Sind Circle.

Mr. P. E. Aitchison	from	1st April 1924 to 23rd May 1924.
,, C. E. L. Gilbert	,,	24th May 1924 to 23rd February 1925.
,, J. Walker	,,	24th February 1925 to 6th April 1925.
,, P. E. Aitchison	,,	7th April 1925 to 6th May 1928.
,, R. W. Inder	,,	7th May 1928 to 31st March 1929.

Mr. T. N. Koppikar and Rao Bahadur R. A. Hemmadi, Deputy Conservators of Forests, and Rao Saheb P. S. Yennemadi and Mr. V. R. Mirchandani, Extra Assistant Conservators of Forests, retired from service during the period under review. Mr. G. E. Marjoribanks proceeded on leave in 1927 preparatory to retirement.

Government lost two experienced officers in the much regretted deaths of Messrs. G. S. Butterworth and W. A. H. Miller of the Imperial Forest Service.

The services of Mr. M. G. Boutelle, Superintendent of saw mills terminated during 1924-25 and were not extended.

No new officers were recruited to the Imperial Forest Service. One Provincial Officer was promoted to this service during the period.

16. General Remarks.

The Forest Grievances Committee.—In response to a demand from certain members of the Bombay Legislative Council, Government appointed a Committee in 1924-25 to enquire into the grievances of the ryots with regard to forest matters and to submit suggestions for the consideration of Government. The Committee visited places in Poona, East Khandesh, West Khandesh, Thana, Kolaba, Nasik, Satara, Panch Mahals, Kanara and Belgaum Districts from which petitions of grievances had been received. A final report on the subject was submitted to Government in 1926-27. Many of the recommendations of the Committee were accepted by Government (*vide* Government Resolution, Revenue Department, No. 7324/24 dated 19th July 1927) and the new concessions granted have been much appreciated by the public. As a further result of the recommendation of this Committee Government have at the close of the quinquennium, sanctioned the formation of Forest Advisory Committees in several districts where forests play an important part.

Military grass lands.—In a Conference of officers representing the Government of India and the Government of Bombay it was decided that rent for the grass kurans in the Poona Division, which were formerly leased to the Military Department free of rent, should be charged at Re. 1 per acre per annum for the two years 1921-22 and 1922-23, and at Rs. 1-8-0 per annum per acre from 1923-24 onwards up to 1931-32. Since the levy of this charge it is interesting to note that the area leased, which formerly showed a tendency to increase year by year, is now much diminished, and still more of it promises to be relinquished by the Military Authorities.

Exhibitions.—The Forest Department took part in the Presidency Agricultural Show held at Poona in 1926, in the Poona Swadeshi Bazar and Industrial Exhibition and in the Agricultural Show at Jalgaon in East Khandesh in 1928.

Fodder storage.—The scheme for the storage of grass against fodder famine at Nawapur, Chinchpada and Khandbara in West Khandesh Division was finally abandoned in 1926-27. The question regarding the payment of compensation to the contractors for their contract having been terminated before the fixed period has been referred by Government to arbitration.

Levy of duty on foreign timber.—Duty was first levied in 1923-24 on timber, fuel and certain other forest produce which has its origin in certain Native States and is brought into the Khandesh Districts by rail. In 1925 the rates of duty were increased with the approval of Government of India. Levy of duty on the dutiable forest produce *produced* in the Native States concerned, whether brought direct into the Khandesh Districts or not, was insisted on as the timber merchants, in order to evade payment of duty, had established in the Central

Provinces, temporary shops where intermediate transactions of the dutiable produce on its way to the Khandesh, were effected. Competent courts have however ruled that duty on produce which has passed through intermediate sale before coming into Khandesh should not be collected unless such transactions are proved to be bogus. As it is almost impossible to prove such a thing the result is that most of the timber, fuel, etc., imported into Khandesh is free of duty. The decision involves a heavy sacrifice of legitimate revenue and also has a serious adverse effect on the price of forest produce grown in British territory, for which there appears to be no remedy.

Miscellaneous.—For the improvement of water-supply and construction of Katcha roads in the Satpudas, Government sanctioned half the cost of these works from '43 A, Famine Relief Fund'. Several wells were constructed and Katcha roads built in the East and North Khandesh Divisions.

Frauds.—Fraud on a large scale occurred in the Kolaba Division where the Head Clerk, Mr. K. V. Dhopeshwarkar, misappropriated a sum of Rs. 5,085 by manipulating the Divisional office accounts. He absconded before clear evidence of his guilt was obtained and has not been traced since. Government have written off ¾ths of this amount, recovering the balance from the Divisional Forest Officer.

Rent.—Rangers, who were hitherto exempted from payment of house rent for quarters provided at Government expense, have been required to pay rent, inspite of strong protest, with effect from June 1928. This has created a good deal of dissatisfaction amongst the subordinates concerned.

Tours of Officers.—The forests of the Southern Circle were visited more than once during the period by His Excellency the Governor of Bombay and by the Honourable Minister of Forests, by Officers of the Forest Research Institute, Dehra Dun, by Mr. W. A. Bailey, Timber Advisory Officer to the Railway Board and Mr. Tassel of Jubulpore Gun Carriage Factory.

General progress.—During the period under review there was some improvement in labour and market conditions. Possible means of increasing the earning capacity of the forests were constantly being explored. These features are testified to by an appreciable improvement of nearly six lakhs of rupees in average nett income, as compared with the figures for the previous five years.

The quinquennium shows great advances over its predecessor in the important matters of regeneration and silviculture, development of road and building work has been well maintained and on the whole it may be claimed that the period has been one of steady progress.

Remarks of Divisional Commissioners on Circle Reports are printed below :—

Commissioner in Sind (Mr. R. E. Gibson, C.I.E.) :—

"The Commissioner in Sind has the honour to state that he has no remarks to offer on the Annual Administration Report of the Sind Forest Circle, for the year 1928-29, received with letter No. 2760, dated 5th September 1929, from the Conservator of Forests, Sind Circle."

Commissioner, Northern Division (Mr. J. H. Garrett) :—

"A Gurcharan Officer has been appointed by Government under Government Resolution, Revenue Department, No. 9811, dated 10th July 1929, for the improved management and more scientific exploitation of the Thana Gurcharan lands.

"2. The total number of forest offences increased from 6,207 to 6,985 during the year under report. In 1018 cases offenders could not be traced, 5,523 cases were compounded bringing in Rs. 40,044 as compensation, in 108 cases offenders were let off with a warning and 46 new cases were taken to court. 54 cases including 39 cases of the previous year were decided during the year, and of which 40 (or 74 per cent.) ended in convictions. The number of fires increased from 509 to 711 and the area burnt from 86 to 89 square miles.

The desire of the villagers to get green grass, communal tension in the Panch Mahals District and illicit distillation are reported to be among the chief causes for the increase in the number of fires. In two cases in the Thana District Villagers' privileges were suspended for bad fire-protection, and rewards amounting to over Rs. 1,300 were given at Darbars held in the Surat and Thana Districts for help in fires and general protection. The Conservator appears to suggest that the increase in offences is due to better detection by the staff in some ranges, but the Commissioner is inclined to attribute it to a wave of unrest which is the result of political agitation.

"3. Receipts from grazing amounted to Rs. 85,836 as against Rs. 82,072 in the previous year. The number of cattle impounded decreased from 37,178 to 34,738 due to better vigilance on the part of subordinates.

"4. The total revenue from the working of the forests in the Northern Circle increased from Rs. 23,94,000 to Rs. 25,45,000 during the year, and the total expenditure also decreased from Rs. 12,18,000 to Rs. 11,74,000. The surplus revenue thus amounted to Rs. 13,70,000 as against Rs. 11,75,000 in the preceding year. The net increase of Rs. 1,95,000 is shared by all the Divisions except the Panch Mahals where a decrease of nearly Rs. 1,00,000 is noticed owing to the absence of unregulated fellings during the year and local trade depression in the timber market. The increase in revenue in the Surat Division is due to the opening up of the Dangs by the new roads, and in Thana to a slight rise in the timber market. The closing of the sawmill at Badgi(Nasik) has partly contributed to the decrease in expenditure. The trading account of the Chikhalda (Dangs) sawmill showed a profit of Rs. 49,000.

"5. Expenditure on 'Communications and Buildings' from the provision under '52-A, Forest Capital Outlay' and subsequently charged to revenue increased from 1,25,126 to Rs. 1,29,713 during the year due to the continuance of work on 53 miles of new roads of which the important ones lie in the Dangs.

"6. Forest Advisory Committees have been formed in the Panch Mahals and Thana Districts in accordance with Government Resolution, Revenue Department, No. 985/28, dated 28th September 1928, as a result of the recommendations of the Forest Grievances Enquiry Committee, and their actual work has begun only after the close of the year under report.

"7. The Commissioner endorses the remarks made by the Collector of the Panch Mahals that a scheme for supplying the deficiency of forest rest-houses for officers and men in the various Divisions should be undertaken early as it will secure better protection, inspection of forests and create more direct acquaintance with the Bhils, Dangis and other forest tribes, and thus tend to improve the administration of forests. The work of new construction of roads in the Dangs and inaccessible parts of the Thana forests requires to be pushed forward with a view to the development of the tract and the growth of forest revenues resulting from transport facilities.

"8. The quinquennial review shows a steady progress in various directions during the five years of forest administration in the Northern Circle from 1924-25 to 1928-29."

Commissioner, Central Division (Mr. J. Ghosal, C.S.I., C.I.E.) :—

"The following review of the Administration Reports of the Northern and Central Circles for 1928-29 in respect of the areas in the Central Division is forwarded to the Chief Conservator of Forests, Bombay Presidency, Poona, with reference to Government Resolutions, Revenue Department, No. 5542, dated 31st May 1919, and 1110, dated 19th April 1921.

Forest areas.—There was a net decrease of 16·3 square miles in the areas under forest in the Central Division owing to the disforestment of large areas in the Poona, Kolaba, Satara, Sholapur and Ahmednagar Districts of the Central Circle and in certain districts of the Northern Circle for purposes of cultivation.

Forest surveys.—No survey work was done by the Survey of India Party No. 8 during the year in the Peint Taluka although some work still remains to be done there.

Management of Forests.—The work of preparation and revision of the scrub jungle working plan for the East Khandesh Division continued during the year. The collection of data concerning waste and pasture forest under the management of the Revenue Department in the East Khandesh Division, with a view to their inclusion in the working plan, as well as the field survey work of 181 square miles of unorganized forest in the West Khandesh Division, requiring a working plan, were

completed during the year. The marking on the maps of the extent of available land for prospective settlements is in progress in West Khandesh according to the instructions of the Collector. Out of 315 square miles of reserved forest in the Poona Division requiring revision, only one working Circle comprising 42 square miles was fully examined during the year. The prescriptions of the working plan were carried out in all the Forest Divisions although some slight changes in the prescribed treatment were found necessary in some cases owing to the lack of demand or in order to introduce some small improvement in the method of working. Some coupes were not sold in the East Khandesh Division. This was due partly to the tightening up of the rules dealing with standard reservation and partly to roads that have been built on the Satpura side. These roads have opened up much Holkari forest as well as our own and the favourable conditions under which these coupes are sold led the contractors to buy them in preference to those in the British territory. It is for consideration whether the import duty on such foreign timber using our forest roads should not be raised. The demand for coupes in West Khandesh on condition of improvement continued to be poor. There was also no demand for clear cutting coupes under the Umarpata working plan. Out of 2 coupes due for felling only one was sold and not worked as it would not pay the contractor. The growth in all the coupes is generally poor and it is apprehended that it would be difficult to work the area under this system.

There was practically no demand for fuel coupes in the Eastern Working Circle of the West Khandesh Division. Out of 5 coupes 2 of current and one of previous year—in all three—were disposed of, while one was worked and others abandoned by the contractors after paying their full values.

The Conservator, N. C., also remarks that some coupes remained unsold owing to want of demand due to one or other of the following causes, *viz.*, poor quality of growth, long lead or inaccessibility of the area due to want of communications.

Communications.—Construction work was in progress in the Central Circle on (1) the katcha road in the Satpuras in East Khandesh, (2) Subir-Navapur road (metalling and consolidation) in West Khandesh, and (3) Dara-Dhadgaon road in North Khandesh, cost—Rs. 15,904

Repairs to existing roads	Rs.	6,969
The work on the Dara-Dhadgaon road has been progressing very well. It is now possible to motor to within a dozen miles of Dhadgaon in the Akrani.		
Goldari-Ozhar road (West Nasik)	Rs.	694
(The work is completed.)		
Hatgad-Vani road (East and West Nasik) ..	Rs.	14,486
Mokhada-Assa road (West Nasik)	Rs.	495

The Collector of West Khandesh remarks :—

" As a marked contrast to the conditions in North Khandesh Forest Division very little appears to have been done in West Khandesh Division in the matter of improvement of lines of communication. A lot is required to be done for opening up the forest areas especially in Chinchpada and Navapur Ranges."

Buildings.—The total expenditure incurred on buldings during the year under report amounted to Rs. 22,458 in the Central Circle and to Rs. 40,488 in the Northern Circle.

Other works.—Seven wells—4 in North Khandesh, 1 in West Khandesh, 2 in Satara, and 5 "shevdis" in East Khandesh—were constructed during the year at a cost of Rs. 3,509. One well and one "shevdi" were also partly constructed in East Khandesh. For the improvement of water supply in Petha and Mhasla in West Khandesh the District Local Board granted Rs. 400 and 200 for sinking a well and for repairs at the end of the year.

In the Northern Circle Rs. 2,117 were spent on new miscellaneous works (wells and fencing) and Rs. 2,181 on repairs. The construction of 5 new wells was started in the Dangs, of which one was completed and the rest were incomplete. The Conservator remarks that improvement of water supply is a very urgent necessity in the interests of villagers and the forest establishment. Unfortunately the location of suitable sites is a very difficult matter and the progress in well construction is consequently very slow. The services of the Water Diviner to Government were asked for but he was not able to come.

Protection of forests.—A statement* showing the number and nature of forest offences in the Central Division is appended. The total number of offences during the year was 7,863 as against 7,695 in the previous year, showing an increase of 168 offences. This increase is noticeable in all classes of offences except ' grazing without permission ', under which there is a decrease of 233 offences.

Injury by fire.—There is an increase in the offences under this head in all Divisions except West Khandesh and Poona (for further remarks see ' Protection from fire '.)

Illicit cutting.—The increase is seen in West Khandesh, Poona and East Nasik. The increase in Poona is due to the detection of illicit cutting on an extensive scale perpetrated by the koli villages of Rajur Range. As a consequence of this 23 villages were raided by the Sub-Divisional Forest Officer, Poona. Teak timber assessed at Rs. 5,195 was recovered and attached. The case was compounded on payment of Rs. 2,404 as compensation. In the opinion of the Divisional Officers in the Northern Circle, the suspension of communal punishment is chiefly responsible for the increase of offences of illicit cutting in the Circle.

Unauthorized grazing.—The decrease under this head is shared by all Divisions except North Khandesh, West Khandesh and Satara where

*Statement not printed.

there was an increase which may be due to subordinates being more vigilant than before.

Other offences.—The increase in this class of offences is noticed in all Divisions, except West Khandesh and Satara. The increase in West Nasik is accounted for by the fact that there was a lot of encroachments from in-forest cultivation. These are likely to be greatly reduced in future as a regular demarcation of these areas by the Divisional Surveyors has been carried out.

Protection from fire.—The area burnt during the year of report was 348 square miles as against 300 in the previous year. The increase is in all Divisions, except Poona, West Khandesh and West Nasik. The abnormal increase in the area burnt in the North Khandesh is attributed to the suspension of communal punishment for forest fires, which has developed in the villagers an attitude of indifference towards fire protection. The Collector of West Khandesh remarks :—

"As regards fire protection, however, there appears to have been a setback, due in the Forest Officers' opinion to the removal of the fear of communal punishment. This system of punishment is no doubt unjust in as much as it punishes the good and the bad alike. In view of the circumstances reported and considering the nature of the people in the tract it might perhaps be worthwhile vesting the Collector with discretion to sanction the infliction of communal punishment in case of proved refractoriness on the part of any village."

The Conservator of Forests, N. C., makes the following remarks:—

"Most of these fires are intentionally started, the chief object being to get an early supply of green grass. They are also due to carelessness in rab burning, to illicit distillation and careless smoking. In West Nasik communal punishment in the form of enhancement of grazing fees was inflicted in 2 villages of Nasik Range with the desired effect as will be evident from the fact that the area burnt in this Division during the year of report decreased from 6,166 acres to 4,550 acres." He further remarks "In spite of all the measures taken so far, forest fires have not decreased. On the other hand they have become so prevalent of late that some further action is necessary in order to bring home to the villagers a sense of communal responsibility. It is therefore proposed that in villages in which fire protection has been bad the burnt areas should be closed to grazing for one year thus making it of no avail to fire jungle for the purpose of producing early clean (sic) (green) grass."

Revenue Administration in the Akrani Mahal.—No remarks to make."

Commissioner, Southern Division (Mr. E. G. L. Laird-MacGregor, I.C.S.

Kolaba.

"The year for Kolaba has been one of steady progress all round. The revenues for the first time* for several years show a surplus, the

*Chief Conservator's note.—The Kolaba Division has been actually showing a surplus each year successively for many years past.

number of offences has decreased, the interest in research and experiment has not flagged and above all the co-operation of villagers on a basis of mutual advantage, as shown in the regeneration of coupes has been successfully obtained.

" The small increase (16 and 21) under fire and other offences is more than counterbalanced by the decrease of 212 and 38 under illicit felling and grazing. The re-stocking of the annual coupes by teak, especially on the sites of the charcoal batties, continued to be satisfactory. The difficulty of economically transplanting the seedlings on a thoroughly weeded out soil was overcome this year by inducing the villagers in the Nagothna Range to take up such plots for Nagli and Wari cultivation on condition that the plots would be thoroughly weeded out at the end of the cultivating season. As many as 26 coupes were given out to 473 families during the year.

Side by side with this, injaili species such as *shivani* (Gmelina arborea), *khair* (Acacia catechu), *hirda* (Terminalia chebula) have also been sown with a fair degree of success.

" Though the introduction of the Manvel bamboos (Dendrocalamus strictus) has not reached the stage of exploitation the exploited coupes have again continued to be planted with the species and the results are reported to be good. All this spade work is largely helped by the nursery in the Pen Range the permanence of which has now been secured by the installation of a rotary pump on the river bank. The results achieved so far are gratifying and as the prospects of the forests depend on the efforts at regeneration, the Commissioner hopes that the hitherto largely successful research and experiment will not be allowed to flag and that in future as in the past the Divisional Forest Officer will continue to give his earnest attention to this branch of the administration.

Though Kolaba forests are burdened with the liability to pay khoti shares of the revenue, the slump in the fuel and timber market appears to have passed. The gross revenue rose from Rs. 1,78,552 to Rs. 2,01,699, and the expenditure fell from Rs. 1,65,496 to Rs. 1,52,685 leaving a surplus of Rs. 49,014. The percentage of surplus to gross revenue reached 24·6 as against 7·3 and 18·5 of last year and the year before last.

The Forest Advisory Committee for the District did not meet in the year and the other recommendations of the Forest Grievances Enquiry Committee have been met so far as they have the approval of Government.

Exploitation of Government teak in malki lands has been noted in the report (Rs. 65,320 is the total revenue realised). But the utility of the statistics would be enhanced if the statistics were given for each forest division separately.

The administration has been satisfactory and the Commissioner endorses the Collector's commendation of the Divisional Forest Officer."

Southern Circle.

The results of the year's working are gratifying. The financial results are fairly satisfactory ; the activities of the Department in planting teak and other junglewood in the exploited and other suitable areas have been well sustained ; the regeneration of sandalwood and the propagation of lac though in their infancy continued to receive good attention. The Commissioner notes with approval that the calls on the Department on account of weeding, clearing and other culturing work necessary to promote healthy growth of seedlings have been fully met.

Though the gross revenue showed an increase of Rs. 15,393 the surplus fell by Rs. 44,085. This is satisfactory when compared with the averages of the last quinquennium. Seasonal factors, fluctuations in the timber and labour markets and the economic conditions of the people in general largely influence the financial results, and it is therefore not safe to gauge the results by the work of a single year. An accurate perspective of the profit and loss account can only be obtained by a review which extends back to at least 5 years. Such a retrospect shows that the average surplus for 1924-29 is in excess of the surplus for 1919-24 by Rs. 5,49,246 which is nearly double that of the previous quinquennium. Returning to 1928-29 the Commissioner finds that all the divisions save Kanara,N. D., and E. D., have contributed small but satisfactory increases to the general revenue. This increase is attributed to better prices realised at depôt sales in Kanara, S. D., to excessive bids received for hirda and shikekai in Kanara, W. D., to sale of old timber and sawn wood at Hattikeri and to increased output of sleepers and sale of *khair* trees for the manufacture of Catechu in C. D., Kanara, to better prices fetched by teak pole coupes and hirda farm in Belgaum and to better prices for coupes in the Dharwar-Bijapur Division. The decrease in Kanara, N. D., is due to the slump in the M. & S. M. Railway demand for sawn timber while the decrease in Kanara, E. D., is the outcome of not adjusting the value of sleepers supplied to the S. I. Railway Co. before 31st March. The Conservator considers the financial results are satisfactory and the Commissioner agrees.

The receipts of the Alnawar-Dandeli Railway once again decreased by Rs. 5,553. As the working expenditure fell by Rs. 10,000 the surplus shows an increase. The drop in the export of manganese ore and timber and the dearth of wagons in the busy season are solely responsible for the poor balance sheet of the Railway. It is to be regretted that this Railway which was specially built to bring the forest resources of Kanara within easy reach of timber markets should have had its activities thus crippled. The Conservator reports that the management was more satisfactory than last year but that the supply of open wagons was not adequate in March and April. The Commissioner hopes that the Chief Conservator will continue to urge on the management the imperative need of keeping an adequate supply of open wagons on this line. A Railway line which is an asset to the Department should not

be thus let down by the management in the height of the working season. It should be possible to run a railway line which is mainly concerned in freight traffic on an expenditure of about 60 per cent. of the gross takings.

The earnings of the 3 Government saw-mills decreased by Rs. 44,019. The Bomanhalli mill was closed down at the end of the year and the other two could not be worked regularly.

Forest offences show the usual variations and these do not call for any special remarks. As compared with the previous year the number of offences has increased—the increase is shared by all the divisions except Kanara, N. D., and Dharwar-Bijapur. The decrease under grazing was counterbalanced by the increase under fire, felling and other offences. In spite of the higher number of fire offences and the increase in the area burnt, communal punishments inflicted were few. There was a marked fall in cattle impoundings. Against 17,628 of last year and 16,224 the average of past three years the impoundings during the current year were only 12,934. This decrease is shared by all divisions except Kanara, E. D., and Belgaum. Dharwar-Bijapur recorded the fewest impoundings. This decrease is undoubtedly due to the extended grazing facilities recently granted in this division and elsewhere it is due to grazing which was available outside forest areas. The number of cattle that grazed in forest also decreased by 3,775.

The burden of civil litigation continues unabated as heretofore. The Collector of Kanara suggests that the forest contracts could be made more business-like by eliminating the system of advance payments to contractors. This is a counsel of perfection. It is no doubt difficult to attract syndicates to the Kanara forests, but the evil would be minimised if contracts were concentrated in the hands of those contractors who have a clean record. The trouble is that the contractors are not wealthy men and cannot afford to have a bad year when prices slump. It has also become quite fashionable to bring a civil suit against Government and no doubt it does give a cachet to the suitor.

The 14 village panchayats which function in Kanara are reported to be doing good work. Most of the panchayats have by now realised the value of the forests entrusted to them, have kept watchmen and have begun to restock their forests. The Collector has been requested to consider the extension of this system to other villages.

Except in a few villages the annual allotments of kumri were fully utilised by the villagers.

During the past five years many concessions have been granted to forest villages and revised forest privilege rules on a generous scale have been adopted in Kanara. The attitude of the people towards the Department has greatly improved. Forest Advisory Committees have been formed for Kanara and Dharwar. The Kanara committee met once, but subsequent to the period covered by the report. The Dharwar committee which also met once is reported to have done useful work on the first occasion, but little interest was taken by the non-officials in the

second. Some time must necessarily elapse before these committees can become useful critics of the Forest Department.

The Conservator complains of the inadequacy of allotments for the upkeep of communications and buildings. This is a legitimate grievance and a very short-sighted policy. Short allotments spell special repairs. The Commissioner is greatly surprised to hear that Rangers now have to pay for their accommodation. They are obliged by the nature of their work to reside in localities far removed from the haunts of men and should be housed cost free as is the case in the Salt Department. In some cases however the Commissioner notes with regret that within the amounts allotted works were not completed owing to the paucity of labour.

The volume of work in the Forest Department increases with each year. New forest coupes have to be exploited, labour imported, contractors found, communications maintained and improved, research and experiment carried on, and the year under review which is no exception to its predecessors covers a period of strenuous work and the results which the Department has been able to record reflect credit on all concerned.

The land revenue administration of Forest Mahals continued to be satisfactory.

The relations between the Revenue Department and the Forest Department were cordial throughout.

Remarks of the Commissioner, Central Division (Mr. J. Ghosal, C.S.I., C.I.E.) on the quinquennial review of the Northern and Central Circles for the 5 years 1924-25 to 1928-29.

Changes in the area.—The area under forest at the beginning and end of the quinquennium was as below :—

	At the beginning	At the close	Difference
	Sq. miles	Sq. miles	
Northern Circle	3,834	3,804	—30
Central Circle	5,382	5,329	—53

The decrease in the net total area of forest is chiefly due to the disforestment of large areas. In the Central Circle much of the forest land was disforested for granting jangi inam or as a reward to military people in recognition of their services in the great war.

Demarcation.—In the Northern Circle there was no change in the length of the artificially marked boundaries which was 8,432 running miles. In the Central Circle the length of the artificially marked boundaries at

the close of 1928-29 was 13,426 running miles as compared with 13,377 at the commencement of the quinquennium. The increase was due to the afforestation of lands.

Surveys.—In the Central Circle 3 square miles of the area of Wadgaon Range and Paud Round in the Poona Division and Rabi lands in Peint and protected forests of Vavar and Vangni in the West Nasik Division were surveyed during the quinquennium.

Working Plans.—The areas under sanctioned working plans at the beginning and close of the quinquennium were as below :—

	At the beginning	At the end
	Sq. miles.	Sq. miles.
Northern Circle	2,777	3,033
Central Circle	2,322	2,499

The following working plans so far as Central Division is concerned were sanctioned by Government during the quinquennium—

(1) A revised working plan for the Western Baragaon Dang (Nasik).

(2) Working plan for the Navapur-Nandurbar forest.

(3) A revised working plan for Peint and adjoining forests.

One new plan for 181 square miles in the West Khandesh Division was under preparation.

Four plans (1) Taloda high forests in the North Khandesh, (2) Umarpata Reserve in the West Khandesh, (3) Scrub jungle, and (4) Jamner Teak working plan in East Khandesh were under revision.

Communications and buildings.—The expenditure on buildings and other works amounted to Rs. 63,950 in the Central Circle and Rs. 7,50,898 in the Northern Circle as compared with Rs. 1,29,955 and 5,63,963, respectively, for the previous quinquennium. In the Central Circle about 82 miles of new roads were constructed and 29 buildings erected. The Conservator, Northern Circle, remarks that "about 65 per cent. of the amount on the new works was spent on the construction of roads in the Dangs and Peint, which contain valuable mature teak going to waste for want of facilities for transport. The construction of a few roads in Peint (West Nasik Division) has resulted in an improvement in the revenue of the West Nasik Division, which has risen from Rs. 1,36,703 in 1923-24 to Rs. 1,61,268 in 1928-29. At present only the most accessible areas in Peint are being exploited, but road projects are under consideration with a view to opening out the remainder of the valuable Peint forests. When the necessary roads are prepared the West Nasik Division, which is at present being worked at a loss, will, without doubt, yield an appreciable surplus and repay any expenditure which may be incurred. Road construction in Peint should be pressed forward with vigour." For want of funds there was not much progress in the building programme.

Forest offences.—The average annual number of forest offences, as compared with those of the previous quinquennium, were as below :—

Description	Present quinquennium	Previous quinquennium	Difference
Injury to forest by fire	1,182	894	+288
Unauthorized felling	6,342	5,362	+980
Unauthorized grazing	4,225	4,625	−400
Miscellaneous	1,507	1,084	+423
			+1,291

There was an increase of 1,291 offences on the whole in the two Circles. The Conservator, Central Circle, remarks that the increase in the number of offences is probably due to the greater vigilance of the subordinates in detecting and reporting offences. Both the Conservators are of opinion that the suspension of communal punishment which was ordered by Government during the last two years, appears to be responsible for a part of the increase, particularly so in the case of fire offences.

Fire protection.—The average annual area under systematic fire protection and the average failure during the two quinquennial periods were as follows :—

Period	Average area in Square miles		Percentage of success
	Attempted to be protected	Failure	
1924-25 to 1928-29	6,247	246	96
1919-20 to 1923-24	5,953	307	94

The Conservator, Northern Circle, remarks that although the area burnt does not show an increase there was an increase in the number of fires.

General remarks.—In pursuance of a Resolution passed at the meeting of the Legislative Council held on 30th August 1924 Government appointed the Forest Grievances Inquiry Committee. The Committee was empowered to visit the more important forests of the Presidency proper, to inquire into the grievances of the ryots in regard to forest matters and to submit suggestions for the consideration of Government. The principal recommendations of the committee and the Government orders thereon are embodied in Government Resolution, Revenue Department, No. 7324/24, dated 19th July 1927.

One of the recommendations of the non-official members of the committee was that District Forest Committees be formed in all Districts with power to hear forest grievances and to report thereon. Though Government were not prepared to accept the proposal in the form in which it was made, they considered that the constitution of advisory committees somewhat on the lines of the Railway Advisory Committees would be a salutary measure tending to secure the free interchange of opinion between officers and representatives of the public and also to enlighten these representatives, and through them the public generally, as to the aims and objects of the policy of the Department and the justification for its actions. They accordingly directed that advisory committees presided over by the Collectors and composed of a limited number of Forest and Revenue Officers and of non-officials should be constituted in every district where forests play an important part. Accordingly Advisory Committees have been appointed in the Nasik, East Khandesh and West Khandesh District in the Central Division.

Revised grazing rules were also sanctioned under Government Resolution, Revenue Department, No. 4217, dated 17th May 1928.

H. L. NEWMAN,

Chief Conservator of Forests,
Bombay Presidency.

Report.

Forest Department.

Administration — of, in the Bombay Presidency, including Sind, for the year 1928-29.

GOVERNMENT OF BOMBAY.

REVENUE DEPARTMENT.

Resolution No. P. 57/2375.

Bombay Castle, 23rd May 1930.

Letter from the Chief Conservator of Forests (Mr. H. L. Newman) No. 2/2344 dated 15th October 1929—Submitting the Forest Administration Report of the Bombay Presidency, including Sind, for the year 1928-29.

RESOLUTION.—The total revenue of the Forest Department during the year amounted to Rs. 73,76,605 and the expenditure to Rs. 42,69,701 as against Rs. 72,85,877 and Rs. 43,06,833 respectively during the previous year. The surplus of Rs. 31,06,904 represents 42·1 per cent. of the gross revenue as against 40·9 per cent. during the previous year. There was a rise in revenue from the Northern and Southern Circles due to improvement in the timber market but this was partly counter-balanced by falls in the Central and Sind Circles. The decrease in the Central Circle is accounted for by the fact that the revenue for grass and grazing was inflated in the year 1927-28 owing to recovery of five years' arrears of rent for military kurans in Poona Division. The decrease in Sind Circle is mainly due to non-sale of some coupes and of departmentally cut fuel.

2. The total number of offences rose from 20,004 in the preceding year to 21,124 in the year under report, the increase occurring in all the Circles excepting the Central Circle. The increase in fire offences was particularly marked, the number rising from 1,737 in the preceding year to 2,188 in the year under report. Various causes contributed to this increase. In the Panch Mahals Division fires were purposely started by or at the instigation of interested villagers of opposing factions in order to inflict injury upon each other. In the East and North Khandesh and the Satara divisions where there was a noticeable increase in the area burnt, the attitude of the local people towards fire offences was far from satisfactory. Government have ordered the suspension of the system of communal punishment in these divisions in the hope that the public will co-operate with Forest officers in the detection of crime. Government are, however, constrained to admit that in the divisions in which the system of communal punishment has been suspended as an experimental measure the requisite degree of co-operation on the part of the people concerned is still lacking.

3. The general progress of areas under artificial regeneration continued to be satisfactory except in Surat, Khandesh and Sind where the abnormally severe frost of January damaged several thousands of well-established seedlings and saplings. In order to minimise damage from fire the experiment of clearing a 5′ line round each regeneration plot was successfully conducted in the North Thana Division.

4. The value of major and minor produce removed by purchasers was Rs. 30,38,000 and Rs. 11,71,000 respectively as against Rs. 28,63,000 and Rs. 11,95,000 in the preceding year. Major and minor produce removed by privilege holders and free grantees amounted to Rs. 10,75,000 as against Rs. 12,16,000.

5. Four saw-mills in the Southern Circle and three in the Northern Circle were worked departmentally during the year under report. Although the total output of sawn timber was 82,727 cubic feet less than in the preceding year, the level of efficiency reached in the running of these mills was maintained.

6. Government regret that owing to continued financial stringency sufficient funds could not be made available for the development of communications and the construction of buildings for housing forest subordinates.

7. Government trust that the appointment of the Gurcharan Officer will lead to better management and more scientific exploitation of the Thana Gurcharan lands.

8. The thanks of Government are due to the Chief Conservator and the officers working under him for the efficient management of the department during the year under report.

By order of the Government of Bombay
(Transferred Departments),

G. K. JOSHI,
Under Secretary to Government.

To

The Commissioner in Sind,
The Commissioners of Divisions,
The Settlement Commissioner and Director of Land Records,
All Collectors, including the Deputy Commissioner, Upper Sind Frontier,
The Chief Conservator of Forests,
The Conservators of Forests, Northern, Central, Southern and Sind Circles,
The Director of Agriculture,
The Accountant General,
The Director of Industries,
The Compiler, General Administration Report,
The Director of Information and Labour Intelligence.

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